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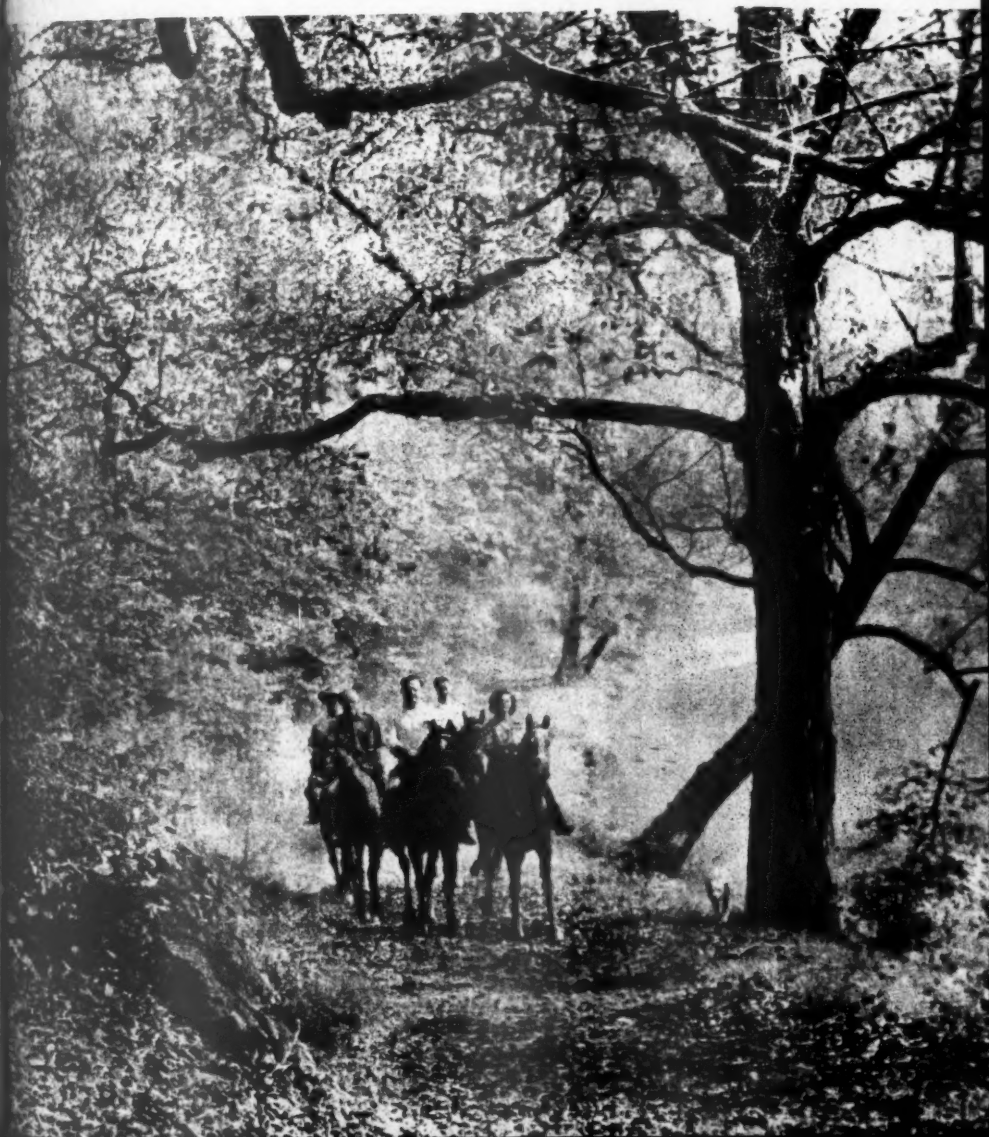

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Organic Gardening

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• Editor and Publisher
J. I. RODALE

Managing Editor
DR. WILLIAM H. EYSTER

Associate Editor
SIR ALBERT HOWARD, C.I.E., M.A.

Art Director
LLOYD PFLEIGER

PUBLISHED MONTHLY BY ORGANIC GARDENING. PUBLICATION, EXECUTIVE, EDITORIAL, SUBSCRIPTON AND ADVERTISING OFFICES; 6TH AND MINOR STREETS, EMMAUS, PA. SUBSCRIPTION RATES, UNITED STATES AND POSSESSIONS, ONE YEAR $3.00, TWO YEARS $5.00, THREE YEARS $7.00. UNLESS OTHERWISE DIRECTED ALL SUBSCRIPTIONS BEGIN WITH THE CURRENT ISSUE. RENEWAL SUBSCRIPTIONS BEGIN IMMEDIATELY AFTER OLD SUBSCRIPTION EXPIRES. WHEN CHANGING AN ADDRESS, GIVE THE OLD ADDRESS AS WELL AS THE NEW. MANUSCRIPTS SHOULD BE ACCOMPANIED BY FULL RETURN POSTAGE AND A SELF-ADDRESSED ENVELOPE. PRINTED IN UNITED STATES OF AMERICA. COPYRIGHT 1947 BY ORGANIC GARDENING. ENTERED AS SECOND CLASS MATTER AT THE POST OFFICE, EMMAUS, PA: UNDER ACT OF MARCH 3, 1879.

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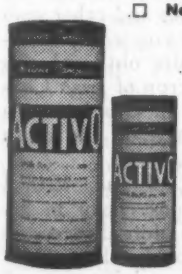

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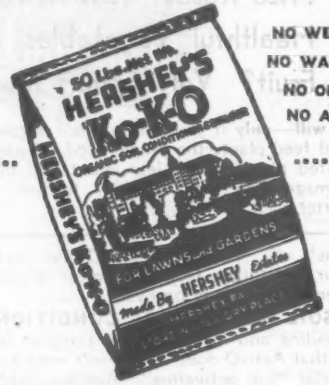

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HERSHEY ESTATES
HERSHEY, PENNSYLVANIA

FREE ECONOMY A PANACEA

August 11, 1947.

I have written to Senator Ives to express my feelings in regard to the expansion of the government's fertilizer facilities.

However, I am totally opposed to your suggestion that the government control crop plantings. I am convinced that this would lead to the same chaos that results from all government interference.

A free economy would solve this problem. The operation of economic forces, if free, would accomplish the desired results far better than the planning of experts.

Please remember that we have never had a truly free economy or real competition throughout economic life.

E. J. Beckert, Jr.,
356 Riverdale Ave.,
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—o—

POTATO SCAB CONTROLLED BY COMPOST

Aug. 11, 1947

In reference to my letter of a little over a year ago concerning a compost program I had in mind to demonstrate the effectiveness of Indore compost in preventing potato scab caused by nematodes, flea beetles and other scab organisms, I thought you would be interested in the results obtained this year with my early crop of Irish Cobblers. My garden is in Westhampton Beach, Suffolk County, on the south shore of Long Island.

In the first week of July 1946 I made my first compost heap in accordance with the Indore Process as described in your book "Pay Dirt" and in "An Agricultural Testament"

by Sir Albert Howard. Both of these books were read with much interest in the winter and spring of last year, and it was with great anticipation that I took the first steps to put the new compost method of fertilization to a test. I completed two heaps by the middle of October. The material included hay, rye straw, vegetable greens and fresh chicken manure. A third heap made of leaves, pine needles, corn stalks and chicken manure was started in early November and carried over until last April.

My vegetable garden was divided into two equal parts each covering 1000 square feet with a three foot path separating the two plots. One was designated as the control plot which was seeded with rye in the late fall and the green cover crop turned under in the early spring this year. Commercial fertilizer (5-10-5) was applied and worked into the soil. This method of fertilization including the green cover crop is the conventional practice used by most potato farmers in Suffolk County, which incidentally is the largest producer of potatoes of any county in New York State. The same chemical fertilizer was used in the rows when the potatoes were planted. Only five 20 foot rows were seeded, three Irish Cobblers and two Green Mountain.

The test plot received a four inch dressing of compost, half in the fall and half in the spring, the fall application being dug in as soon as spread on the soil and the ground left in bare rough condition all winter. On April 12th the plot was turned under with the second coating of compost and the same varieties of potatoes planted directly opposite the five rows in the control plot. The seed in both cases came from the same lot purchased at a large New York seed company. The soil in both plots was tested by the nearby government agricultural extension service and showed a pH of 5.6. As you know potato scab usually occurs above 5.4 pH. The agricultural station later told me my soil was ideal for the presence of scab organisms.

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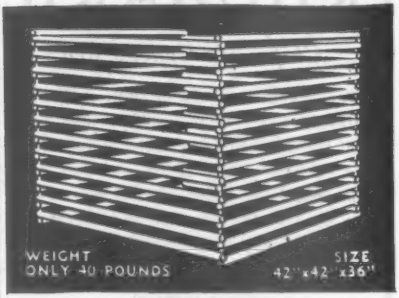

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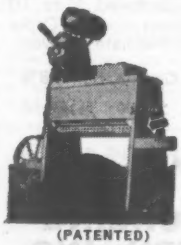

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You may be aware of the publicity now being given to the damage being done to potatoes on Long Island by scab organisms, particularly the golden nematode.

On July 31 I dug the Irish Cobblers from both plots, and you can imagine my satisfaction when I found the potatoes in the test plot were entirely free of scab showing a fine clear skin and averaging a bushel per twenty foot row or at the rate of well over 600 bushels per acre. The average yield in this county is between 300 and 400 bushels an acre. To make the test decisive nearly all or about 80% of the control plot potatoes were badly infected with scab and showed a yield 25% below the test plot.

While I realize my experiment was on a very small scale and represents only one year's crop, the complete absence of disease in the test plot as against a heavily infected crop on the control is about as nearly conclusive a demonstration as possible. It should be emphasized these results were obtained in closely adjoining plots having the same pH analysis which was very favorable to scab formation.

Shortly after digging the potatoes I took samples from each plot to the state research farm where my soil was tested and showed them to the chief soil scientist. After telling him exactly what methods I used in fertilizing each plot, I said, "How do you explain the great difference in the condition of the potatoes?" His answer was, "I only wish I knew." He expressed interest and surprise that I had produced such healthy clear skinned potatoes in soil so favorable to scab organisms. Furthermore my soil is a very sandy loam as compared with silt loam on most of the good potato farms. The soil scientist said one season's crop didn't prove anything, but if I had equally good results in a couple of more crops he might be convinced that compost was the answer.

I then told the government agricultural agent that I was going to plant my own seed next spring from this year's crop. He smiled and said he

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would wager that 50% of next season's harvest would be virus infected and the following year 100% infected. The results in the control plot may be expected to prove his wager correct, but I'm willing to bet the test plot seed will produce as healthy potatoes as I dug this year.

While the soil scientist requires a more lengthy demonstration and a larger scale operation to be convinced of the effectiveness of Indore compost in potato scab control, I believe the results of my small test point definitely to the successful way of growing disease free potatoes, and at the same time building an increasing supply of greatly needed humus. Unfortunately the potato farms, representing the largest business in this country, have abandoned the use of manure, relying exclusively on green cover crops and chemical fertilizers, with the result the soil humus is rapidly being exhausted. The inevitable consequences are disease and disastrous soil erosion.

If some of the government agricultural research men and a few open-minded farmers can be convinced of the value of properly composted animal and vegetable wastes, we will have accomplished much in solving the major problems of potato farming, as well as in the growing of many other crops. It seems to me the best way to create interest in the use of compost is through comparative results as shown by organic vs. chemical fertilization.

I hope to make further tests on other vegetables as well as potatoes, and would appreciate any suggestions you may have with regard to carrying out the experiments.

Hugh A. Ward,
311 East 72nd Street,
New York 21, N. Y.

—o—

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July 20, 1947.

I read a letter in the July issue of the Organic Gardening saying that a lady was having trouble with the rab-

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WRITE FOR CATALOG

bits eating her green peas. Here is a remedy that is sure to work. I had all my peas eaten off at the ground before I learned of this remedy. After the peas are about an inch high, spread a light coat of fresh horse manure right on top of the row. The peas will come right on through the manure and not one will be eaten by the rabbits. I enjoy the Organic Gardening.

Alfred L. Plummer,
P. O. Box 925,
Greensboro, N. C.

—o—

EARTHWORMS THRIVE ON SUGAR BEETS

July 15, 1947.

Perhaps it would be of interest to your readers to know how I circumvented the sugar shortage in raising earthworms before the restriction was taken off. Last fall I got a bushel of sugar beets, cooked a few at a time, put them through the shredder of my electric mixer, and you should have seen how the worms did grow and multiply in my basement all last winter. From the five hundred I started with, to eight thousand full grown worms to say nothing of the hundreds of small worms and capsules. I used some honey before the beet sugar method came to me. The earthworm raising world is welcome to use my idea.

Mrs. C. E. Beck,
Grant, Nebraska.

(EDITOR'S NOTE—Thanks for the good idea.)

—o—

ENTERTAINING AND EDUCATIONAL

July 30, 1947.

I received my first issue of Organic Gardening Magazine on my return from work yesterday. I found it so interesting that I read far into the night and have devoured almost every page of this very interesting and educational magazine. I am indeed grateful to the person who introduced me to the Organic Gardening Magazine.

I have a garden about 42 x 50 feet and grow both flowers and a few vegetables. I have been making a compost heap and am afraid it has been rather haphazard as I used some chemicals in it. But from now on I will find the time and the space to do it the right way.

Elsie R. Schaub,
5622 N. 2nd St.,
Phila. (20), Pa.

—o—

CHEMICALS AND SPRAYS NO SUBSTITUTE FOR MANURE

July 16, 1947.

Sometime ago I received a little folder and read it with much interest. Your philosophy agrees with mine exactly. In fact I have been trying to think up a scheme to publish such a magazine. And NOW I find that one is already being published. The world is bigger than I thought it was, I guess.

When I was a kid we had some of the finest apples I have ever seen. And we did not know what spraying was. However, we had hundreds of little orioles and wrens flying around through the trees. Now we seldom see these little feathered allies. We knew no commercial fertilizers. We could not have got them shipped to us if we had wanted them. I was born and reared in Overton County, Tennessee. We had no boys with air rifles and very few cats. We just planted things and let them grow. We utilized all the manure from the barn after it had gone through a process of "aging" as we called it. We took the rotten straw from the old straw stack and scattered it on the field and plowed it under.

I retired April 6, 1946, at the age of 50. I bought a little 40 acre farm here and am just playing with it. Last year I sold $400 worth of apples from a two acre orchard that had been badly mistreated before I got it. I did not spray the trees. I did not prune them except for cutting out dead wood. I have attracted four

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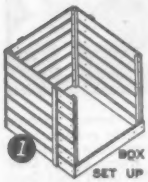

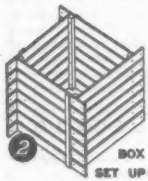

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families of house wrens to the orchard. Also two families of bluebirds and a few orioles. I am trying to increase the population of helpful insects, Red Wasps, Praying Mantis, and long legged spiders. I did not see a single potato bug on my potatoes this year. When the neighbors ask me what spray I used I told them none. I told them that I used a rusty knife to cut the seed potatoes.

I am looking forward to building up a very sincere friendship with your magazine, but will not bore you further at this time. I wish you could see my pumpkin patch just now.

Lewis N. Stewart,
Route A.,
Flippin, Ark.

—o—

DDT KILLS ALL

July 10, 1947.

My neighbor was sold on DDT as a cure-all. Well ants sure love their aphids and a lemon tree is an excellent host for aphids. So he painted the trunk of the lemon tree with DDT to eliminate the ants. Well, the ants are gone and so is the lemon tree. The DDT killed the life-giving bark.

Marvin S. Anderson,
3724 Meier Street,
Venice, California.

—o—

O. G. FOR GOOD READING

May 13, 1947

Enclosed remittance in the amount of $7.00 is my way of guaranteeing us the best literature for the next three years. Mrs. Gerhardt and myself have gained more constructive and productive knowledge from Organic Gardening publications during the past year than has been attained in numerous years of relying on the trial and error method of gardening.

Last Fall, we were fortunate in arranging with a contractor, who gathers the leaves from the streets of a nearby Toronto suburb, to bring us one load of leaves, the total cost was $2.00, which represented the trucking charges. These leaves had been gathered while wet and I believe we must have received about two tons in all.

This was such an amount that I was kept busy with the wheelbarrow for many evenings. We distributed the leaves throughout our raspberry patch and over the cultivated sections of our garden, in very generous amounts. The effect at this writing is astounding, insofar as worm population is concerned.

I might add, that our winters are very long and severe, weeks on end 10 to 20 below zero is quite common. As an experiment; and one which certainly was sure to prove fatal, I covered our 200 choice Gladiolus with leaves to a depth of 18 inches. This past week-end, I removed the leaves and carefully probed through the earth and worms, examining corms in various sections of the bed. To my utmost amazement, the corms are in excellent condition, exceptionally well developed and firmer than I have ever witnessed when handled the way we usually do, that is, when dug and stored in the conventional way throughout the winter. I am quite curious to see how they develop during the blooming season. Findings in this regard will be forwarded more from a curious standpoint than from a recommended procedure.

We have had very good results from a small compost heap built last August, using prepared sheep manure. Two larger heaps built with manure delivered in October, were started too late and remained frozen all winter, these have been moved to a different location and rebuilt without additional material. We feel that they will come along in due time.

One could go on and on relating experiences, even over a one year period of practicing your suggestions. The main issue at this time is to keep the good book coming and thereby, assure ourselves of the ultimate in good sense gardening. So, wishing your organization every success and trusting that your many subscribers continue to submit items of interest gained through following your advice, I am,

F. Gerhardt, Jr.,
79 Ellerslie Ave.,
Willowdale, Ontario

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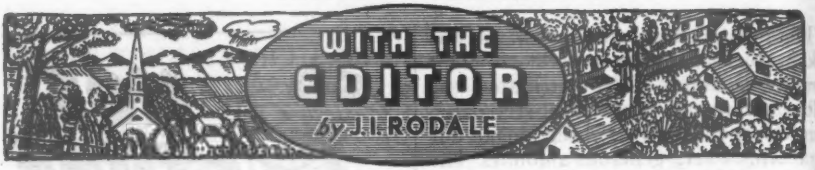


The Rodale Diet

FOR about five years Organic Gardening Magazine has been campaigning against the use of strong chemical fertilizers in connection with the growing of food crops. Some modest progress has been made in influencing farmers to discontinue their use. This tendency has been taking on increasing proportions in the last year, but it will be a long time before even appreciable amounts of organically grown foods are available generally in the public markets.

Thousands of our readers, however, are producing a goodly proportion of their own food supply, but do not have any for sale to others. There are many thousands of others, unfortunately, who listen to our preachments, who are aware of the danger to their health of consuming a diet devitalized by the pollution of the lands with strong fertilizers and poisonous sprays, but who are baffled by their inability to do anything about it. It is for them, mainly, that this article is being written, especially if they live in the larger cities where even small plots of ground for a food garden are not accessible.

There is something these people can do about it and this article will be a preliminary discussion of the subject. I am calling my plan the Rodale Diet so that it may be instantly recognized when it is mentioned and thus is not confused with something else. It cannot conveniently be called an organic diet because it would conflict with the idea of an organically produced diet. You will see what I mean as we go along.

FISH—There is a tremendous amount of fish available in the big cities, and with modern refrigeration, it reaches the most out-of-the-way inland regions. I am referring to salt-water fish. Here is an animal that, unlike cattle, does not eat food raised with chemical fertilizers. It feeds in waters rich with minerals, prominent among which is the most valuable element iodine. In the RODALE DIET only seagoing fish such as halibut, flounder, etc. are included. River and lake waters may be polluted with factory and other wastes. Your fish dealer will distinguish both kinds for you.

Some of the healthiest races of people in the Pacific Island areas have a diet more than half of which consists of salt-water fish. A few years ago the New Yorker Magazine published a wonderful article about a Mr. Flood who was about 92 years old at the time and whose entire diet consisted of salt-water fish and alcoholic beverages. I was amazed at the time I read it that Mr. Flood was quoted as saying that because chemical fertilizers were being used on such an increasing scale, modern foods were becoming less and less appetizing and that eggs, in his opinion, tasted like the brim of a straw hat. Mr. Flood is a precious old character and if you want to read about him refer to the New Yorker, issues of January 1 and November 25, 1944 and August 4, 1945.

Mr. Flood, who lives in a small

hotel in the New York City South Street water-front usually gets his fish direct from incoming fishing vessels, with whose captains he is well acquainted. He will take such a fish right into a nearby restaurant where it will be cooked according to his directions. Mr. Flood today must be about 96 years old, and going strong. Now if we will adopt the fish and leave out Mr. Flood's whiskey we have a good beginning for a healthy diet. Spend a vacation at a seashore fishing resort where fresh fish is available every day. Our family spent a memorable few weeks at Gloucester, Massachusetts, last summer and this year we ate many a fish meal at Fisherman's Wharf in San Francisco.

Coming back to fish, they are much less visited by disease than land animals and if prepared well, fish can be extremely tasty food. As between fish and the lower forms of marine life such as oysters, clams, lobsters, etc. I am not in a position to say. It probably would be best to keep to a well balanced variety with more than half in the form of fish. At this point let me say that this diet is in an experimental state and much research will be gone into until it is considered complete. In the meantime readers of this magazine can be of great help by writing to me of any special knowledge they have which would throw additional light on this subject. If you know of conditions under which inland water fish live, which may affect their status under this diet, favorably or unfavorably, will you please write me?

KELP—There are many concerns that are harvesting the sea for crops of seaweed out of which kelp powders are made. These may be purchased at health-food stores. Kelp is rich in potassium. It is believed that the reason there is a complete absence of hay-fever cases in the Orient is the fact that the Japanese and Chinese eat liberally of this product. It is rich in vitamins and minerals, especially iodine which is a must for people living in those regions where goiter is endemic. Kelp is somewhat bitter and is best used when mixed with other foods and dishes where the taste is disguised.

MUSHROOMS—Here is a food that is never grown with chemical fertilizers because it would kill out the very spores which are needed to develop into mushrooms. It is usually grown in beds of rich humus. Only manure is used and it is usually aged or composted. Only until recently it was held that mushrooms contained little nutritional value but modern opinion has changed. The Pharaohs of Egypt prized the mushrooms highly. The Romans knew the value of this food and called it "food for the Gods" which was served only on holidays. Horace wrote poetry about mushrooms before the Christian era. In those days this food was believed to provide strength in battle.

Mushrooms are rich in valuable proteins and in this respect compare favorably with many popular vegetables. They are unusually rich in iron and also contain appreciable amounts of potassium and copper and smaller quantities of phosphorous and calcium. They abound in the B vitamins. One should not overlook also their delicious flavor.

COCOANUT—First of all this is a delicious food practically always available. It grows principally not far from ocean shores and it is not the custom to fertilize the cocoanut palms. It is a good source of fats and carbohydrates and valuable for its bulk. Incidentally its eating provides excellent exercise for the teeth. Be sure to drink the cocoanut water. It contains small quantities of vitamin B. Bear in mind that the cocoanut is the seed from which a tree can grow. It is therefore rich in living qualities, or enzymes, which must be a valuable factor in the food equation.

WATER-CRESS—Water-cress is never grown with chemical fertilizers. It grows along brooks and other running waters and requires a limestone

formation of soil. It is a valuable addition to salads. Its tart taste is due to its potassium content. It is high in mineral content and is an excellent source of vitamin C, while its A and B content cannot be ignored. It contains more iron than spinach. This food is highly recommended.

INDIAN NUTS OR PINYON PINE NUTS—This "nut" is on sale in most big cities and grows in the mineral rich soil of the desert sections of our country. It is an excellent source of proteins and was a staple part of the Indian diet. Nate that it is a seed and contains the power to grow a new plant. Seed foods should be a prominent part of the diet.

LICHEE NUTS—They are usually obtainable in the various China towns of New York, Boston, Philadelphia, San Francisco, etc., sometimes in Chinese laundries. They grow under tropical conditions and come from China where chemical fertilizers are practically unknown. They are unusually delicious, having a prune-like taste and probably should be eaten in moderation as they are a specific for constipation.

BERRIES—Mulberries usually grow without the use of chemical fertilizers and are never sprayed with poisons. In connection with raspberries, huckleberries and black-berries, they grow wild for the most part. The Connecticut Agricultural Experiment Station under date of August 18, 1947 wrote me—". . . our wild blueberries, raspberries and blackberries are not fertilized. The first mentioned appear on our markets in Connecticut, coming to us all the way from Maine or Nova Scotia. Southwestern Massachusetts produces a good many which get into our markets."

PALM CABBAGE—The Agricultural Experiment Station at Gainesville, Florida advises me that "there are a few foods generally grown in Florida without the use of chemical fertilizers, insecticides or fungicides. One of these is the palm cabbage which is the bud of some of our palmetto palms which grow wild. In removing this bud, the tree, of course, is killed, but palm cabbage has been eaten in Florida for many decades. It is my understanding that there is some prohibition against the selling of it commercially. (EDITOR'S NOTE—I have heard that it is served in Florida restaurants.) I believe it is safe to state that a great many arbors of muscadine grapes are grown without the use of fertilizers or sprays."

WILD RICE—This product is finding its way in packaged form to the grocery shelves of our nation. It grows wild in Southern swamps, but it is possible that artificial cultivation may be attempted. Can some of our Southern readers enlighten us on the cultural practices in regard to wild rice?

MEAT—Wild game such as deer, duck, etc. furnishes a form of meat that is more or less free of the taint of chemical fertilizers as these animals feed in wild fields and forests. A graphic illustration of the value of eating such meat came to my attention a few years ago when I heard of a Pennsylvania physician who was doing wonderful work in reducing high blood-pressure of patients by having them eat wild game meat. With the popularity of refrigerated meat lockers you might find a way to get some of this meat. Here is another vacationing idea—go to the hunting regions during the proper seasons. Many of the resorts serve venison and other game meats. You might also like the excitement and color of the hunters all about you.

NOTE—This is an elementary statement of about one-half of the Rodale Diet. More material will be given next month. As we go along it will be refined and increased. Eventually it will be published in book form. The readers of this magazine can participate in this project by writing us of any facts which bear on this diet that they may know of.

(To be continued)

J. I. Rodale

Labour Saving In Compost Manufacture

By SIR ALBERT HOWARD, C.I.E.

THE widespread adoption of the Indore Process for converting a mixture of vegetable and animal wastes into humus has drawn attention to methods by which the labour needed can be reduced to a minimum without loss of quality in the final product. One such method is being worked out at Iringa in Tanganyika by Mr. J. E. Macartney-Snape. Here the force of gravity has been utilized in such a manner that no lifting of the wastes is needed between the cattle shed and piggeries, on the one hand, and, on the other, the carts which carry the finished compost to the fields.

The details of this composting factory, which has been in successful operation for the last two years, are as follows. Upon a platform, levelled off on the top of sloping ground, are built the cattle shed and piggeries. The next level was excavated to a depth of 4 ft. 6 in. below this platform to accommodate a light railway with tip trucks; and upon the same level were dug twenty-one composting pits, each 27 feet long by 15 feet wide and 2 feet 6 inches deep. They are separated by berms which, to prevent the earth falling in, are faced with bricks. The floors of the pits are of earth which is broken up with a fork now and then to promote the aeration of the fermenting mass of straw and other vegetable wastes or roughage and manure. The end of each pit next the cattle shed is protected by a wall; the end away from the shed is left open for filling the carts; but during the actual making of the compost it is closed by means of a movable frame. The side of the byre towards the composting pits has hinged gates made of poles, each 8 feet by 4 feet 6 inches, which hang from their hinges and open outwards when the soiled bedding from their particular section has to be transferred to the trucks. The 4 ft. 6 in. wall between the trucks and the byre has a slight lip to it which just overhangs the edge of the trucks. When the byre is being cleaned out, the soiled bedding is raked with fork hoes to the edge of the wall and falls into the truck. When the truck is full, it is pushed opposite the end of the pit which is being filled and tipped into it. Mr. Macartney-Snape turns the compost at least twice. It depends on the roughage used as to whether the compost is ready at the end of ninety days; if not, it is turned at intervals of thirty days until it has matured.

At the open ends of the pits away from the cattle shed there is a cutting wide enough for carts and deep enough to allow the bottom of the pits to be just above the top edge of the carts, which are brought under each pit in turn when the compost is ready to be distributed.

These ingenious arrangements enable the material to be handled without having to lift it. A vast amount of labour is thereby saved.

At Iringa 200 cattle are housed in this byre every night. All the work involved in the bedding down of the

animals, the removal of the soiled litter, the management of the pits, and the loading of the finished product into carts is done by two boys. They can load a ton of compost (two cubic yards) in four minutes. The watering of the fermenting material is done by a hose from piped water laid on.

The output of the factory depends on the amount of bedding available. Provided this is ample, at least 2,000 tons of compost could be made every year, i.e. at the rate of 10 tons per animal.

Here we have a remarkable example of the way labour can be saved in compost making. On many of the hill farms in Great Britain and the United States it might easily be possible to make large quantities of compost by means of the spare labour of the family. The only additional expense involved would be the construction of the pits, the light railway and trucks, and the deep roadway for the carts.

The Amateur Makes Discoveries

AN EDINBURGH, SCOTLAND NEWSPAPER carried the following item sent in by a cooperative reader:

Strawberries as big as golf balls. Over five tons of them.

And all from one acre of ground.

That's the record crop which means £600 to William Macdonald, The Nurseries, West Pitkerro, Angus.

What's his secret? For two years before planting he put 100 tons of farmyard manure a year on the ground.

He put his plants 18 inches apart and with three feet between the lines.

When he planted in June 1944 critics said he was "at least three months too soon."

This year the critics got 2½ tons to an acre. Mr. Macdonald's pickers have turned in five tons, and are still picking!

Helichrysum—Everlasting Strawflower

Strawflowers—Echoes of Summer

Dr. William H. Eyster

NATURE has been most generous in giving us so beautiful a habitation as the surface of the earth with its green carpet and its brilliant colors and varied forms so richly expressed in the leaves and flowers of plants. It is like a vast stage with the scenes being changed from week to week and from month to month. The most bold and hardy plants, as the Snowdrop and Crocus, bloom so early in the Spring that we are deeply concerned when they are ever so gently covered by the last snows of winter. These harbingers of Spring are the leaders of a grand procession of flowering plants which spring from the earth as if by magic, make a rapid vegetative growth, unfold their flowers, and mature their seeds in endless succession during the Spring, Summer, and Autumn. They may be regarded as a great orchestra rendering a composition in color, form, and arrangement; the melody being carried first by the flowers of Spring, later by those of Summer, and finally by the flowers of Autumn with the great finale rendered so magnificiently by the Composites, especially the Zinnias, Marigolds, Asters, Calendulas, and Strawflowers in the garden and by the goldenrods, asters, bonsets, and ironweeds in the meadows and fields. A fitting stage

setting for this finale is afforded by the brilliant colors of the autumnal leaves of many trees and shrubs, especially those of the Maples, Oaks, Sumacs, Sweet Gum, and Virginia Creeper.

Strawflowers are the largest and showiest of an artificial group of plants commonly known as Everlastings or Immortelles. Everlastings may be thought of as the echo of Nature's composition of beauty which resounds throughout the months of Winter. The vases which displayed the daffodils and tulips of Spring, the Lilacs of May, and the Roses of June are just as decorative and charming with well arranged sprays of immortelles. This group includes all plants whose flowers can be dried without losing any of their color or substance. Although there are 20 or more genera of plants which qualify as immortelles, I shall limit my discussion here to the genus *Helichrysum,* a Greek word meaning Sun Gold. All plants belonging to this genus are commonly called strawflowers.

Strawflowers are attractive plants for the border to which they give brilliant colors in late summer and autumn. They produce an abundance of flowers in colors ranging from white through various shades of yellow, red, and purplish-violet. The seeds should be sown early in the Spring, under glass if possible, but in any case as early as the conditions of the soil and weather will permit. When sown directly in the flower border, the seeds should be scattered in drills half an inch deep, four inches apart and later thinned to eight inches apart.

The flower heads which are intended for winter bouquets should be cut when they are only partly unfolded, the leaves carefully stripped from the stems, tied into loose bunches, and hung up to dry with their heads down in a cool dark though dry place where there is a free circulation of air. The stems should be sufficiently long to permit effective arrangements in the vase. When thoroughly dry, individual bunches may be carefully covered with waxed paper, pinned snugly to keep them free from dust or put in bags and stored until used. If placed in paper bags, the color of the heads should be noted on the outside of the bag as an aid in selecting flowers for arrangements.

In the arrangement of strawflowers, the same principles apply as in the arrangement of fresh flowers. Since they have no leaves, they may be used with sprigs of evergreens, with other kinds of everlastings, or interspersed in a fruit arrangement to give a jaunty note to the dinner table. It is perhaps unnecessary to add that even though these flower heads are everlasting in the sense we are using this term, they will collect dust, and new arrangements from fresh heads should be made from time to time. Variations in the arrangements may well reflect the different moods of the winter season.

Quick Return Method

WILL READERS tell us of their experiences with the Maye E. Bruce, Quick Return preparations in connection with the making of compost with it? We are experimenting with it, but it would be valuable to secure a cross-section of experience covering the entire country.

WONDERFUL RESULT

July 24, 1947.

This summer our little nectarine tree developed a bad case of *leaf curl* or *yellows* and my wife, after reading in one of your magazines about a lady who doctored all her sick plants and shrubs with compost, set out to cure this diseased tree. She lifted away the mulch I had around the base of the tree, applied the compost, and replaced the mulch. In a month every trace of the disease was gone. She had cured the tree and restored it to normalcy by this simple method. All praise to the organic plan for I believe it to be God's plan.

L. N. Nivison,
Coalmont, Tenn.

—o—

GOSPEL OF PAY DIRT

August 1, 1947.

Last Fall I placed under the ground dry maple leaves and covered them with fresh chicken droppings. In the Spring, when I turned the ground, I was amazed to see so many earthworms, especially little ones, under the clumps of the leaves which did not disintegrate in the cold weather. Now look at the enclosed snapshot and see for yourself if I have not been converted to the Gospel of Pay Dirt.

If people would eat more vegetables grown in compost and decrease the protein intake in their diets they would ease the function of the liver and kidneys much overworked by the waste products of excessive nitrogenous foods. This evidence carries conviction.

E. D. Cuevas,
Sparkle Lake,
Yorktown Heights, N. Y.

LADYBUGS PREFER COMPOST-FED APHIDS

July 19, 1947.

Being in the Nursery business, I have always thought it necessary to do a lot of chemical fertilizing and spraying for insects that seemed ever to be on the increase in spite of every effort we made. Since reading Organic Gardening I stopped the spraying and as usual a few of the aphids could be found on the bottom of walnut leaves. I used no spray and within two weeks the aphids disappeared. Instead of aphids there were countless numbers of ladybug larvae. The credit goes to the fine work of the Organic Gardening Staff.

Harry P. Burgart, Prop.,
Michigan Nut Nursery,
Union City, Michigan.

—o—

COMPOSTED BEANS WITHOUT BEETLES

June 10, 1947.

First, let me say the best investment I ever made was the day I sent you two dollars for a year's subscription and a little booklet you sent entitled Compost—How to Make It.

Up to that time we were using chemical fertilizers and not at all satisfied with the results, so we stopped and took your advice. Now our place is looking as it should.

I could not understand why we never saw any earthworms. When at home as a child in Georgia we had them that sometimes looked like young snakes and then I remembered I never saw bags of fertilizer around, but always used cow and chicken manure made into hugh piles with leaves and dirt. So when I got your

book I knew I had found the right way to grow anything I wanted to grow.

Last year I read in one copy of Organic Gardening about rock mulch, so one day while my husband was busy in the garden I decided to rock mulch the plants in my back yard, including two crepe myrtles that had not grown a foot in five years. Well, I was not able to walk for about three days but believe me, my work is paying off this spring. The two crepe myrtle plants would not be recognized as the same plants.

When we used chemical fertilizers we planted beans which, by the time they were three inches high, were full of holes where bean beetles had chewed the leaves and the plants would be yellow with the little pests. This meant that we had to dust and spray. But this year, our compost-grown beans are up tall and ready to bloom and nary a beetle or bug. So you see why my husband and I are Organic Gardening and Compost fans.

Mrs. Robert R. Wolverton,
6361 Branch Ave., S. E.
Washington (20), D. C.

—o—

A CHAMPION

July 10, 1947.

I started with my first edition of my subscription to Organic Gardening Magazine building my compost garden three years ago. It consisted of one acre of hard, yellow clay soil, or you might say concrete, for it would settle almost to that hardness after a rain. It was most discouraging. My wife and I would plow and hoe getting the soil loosened up and then a big rain that was not needed would come and pack it like concrete. We were ready to give up the idea of trying to raise a garden on it and let the ragweeds have it, when by chance I saw an advertisement of your magazine stating the value of compost to poor, run-down soil. With my first edition I began building compost with this acre of ragweeds, grass clippings, leaves, cotton hulls, and anything I could find that I thought would be suitable for compost.

It took a lot of hard work gathering material and building the compost heaps and scattering them on my ground with a sled and horse. But like a lot of people who work hard at baseball, basketball, football and other games of sports and call it recreation, this is my game of recreation. And to anyone who loves to grow beautiful flowers and delicious vegetables and fruits, I doubt if there is any greater enjoyment that he gets out of his recreation. Therefore, my type of recreation has begun to pay off.

I have treated almost half of my garden with compost. It no longer packs, and within an hour after a rain I can work it. It's as loose as an ash pile and as nice a garden as I ever have seen. I dug my potatoes a month early this year and every hill would have 6 to 10 nice potatoes under it. My potatoes were first on the market with top prices. I have been selling tomatoes for three weeks and have not heard of anyone else having ripe tomatoes in this neighborhood yet. I put out one thousand cabbage plants and most of them were sold before other people began to bring a few to market. So you can see in my game of recreation I kinda feel like a champion.

In all teams of sports there must be a coach or manager, and the winning team or champion owes a lot of credit to his captain. Therefore I want to thank you and your Magazine for showing me the value of organic gardening, and how to accomplish it through composting.

I am not selfish neither do I wish to keep this good information to myself. Therefore I am enclosing my check for $3.00 for one year's subscription to Organic Gardening Magazine that my neighbors might obtain this good information. This city has a public library. Please mail to them this subscription.

N. V. Harris,
Piggott, Arkansas.

A Cry For Natural Food

By DR. EHRENFRIED E. PFEIFFER

EVER so often, in the early morning hours, an airplane with a trailing tail of mist flies over the neighbor's orchard. When the wind is right one can even feel a metallic taste on the tongue afterward, descending through the air.

Ever so often, farmers and commercial vegetable and fruit growers receive Agriculture Department leaflets and Extension Service bulletins: spray your fruit trees, spray your vegetables, spray your chickens, your turkeys, worm your sheep.

A pressure sprayer or tankwagon has become a "must" in growing "healthy" crops. Recently, the chemical fight against weeds has been added. The workshop, nowadays, contains more chemicals than tools, and the really "advanced" gardener and fruit grower has of necessity become a kind of chemist in the chemical warfare against pests and diseases. Tongue twisting chemical names run from his lips.

These are the enemies which he is called upon to fight and the remedies to be used to kill these enemies (please have patience while reading this list):

Apples: scab, codling moth, bud moth, apple maggot, plum curculio, rosy aphis, cedar rust, sooty blotch, fruit tree leaf roller, San José scale, scurfy scale, apple redbug, European red mite, green aphis, wooly aphis. In addition, there may be other pests and diseases more locally developed over certain areas.

The sprays: dormant spray—emulsion oil; greentip spray—mixture of Bordeaux, lubricating oil, nicotine sulfate; delayed dormant spray—lime sulfur, nicotine sulfate; pre-blossom spray—lime sulfur, lead arsenate; special bloom spray—copper sulfate, hydrated lime; also dimethyldithiocarbamate; calyx spray and curculio scab spray—lime sulfur and lead arsenate; summer sprays—nicotine sulfate plus a fungicide as often as necessary. Four codling moth sprays have to be applied, f.i. two brood sprays.

Pears: require a dormant spray, a pre-blossom spray, a special bloom spray, a calyx spray, a first nymph spray, a special spray for rose leaf beetle, quince, curculio and sinuate pear borer, at least four summer sprays.

Cherries: require similar sprays, at least five to seven different kinds.

Peaches: 4 special sprays (leaf-curl, pre-blossom, shuck and summer) of the last mentioned 6.

Plums and Prunes: 2 specials, 6 summer sprays.

Quince: 3 specials, summer sprays at two-week intervals.

The vegetable crops are no better off:

Cabbage: cauliflower, broccoli, and related crops suffer quite a bit too. There are: cabbage root-maggot, treatment with mercuric chloride and calomel; black-rot and black-leg—hot water seed bath is advised, and a crop rotation in which one does not come back to the same field with cruciferae before the fourth or better the fifth year. Contaminated manure or cabbage refuse will spread these diseases. Against yellows, disease resistant strains are needed; clubroot (treat with corrosive sublimate, a mercury compound, or with hydrated lime); downy mildew, appearing on almost every plant in the cabbage family (control with Bordeaux). Then there is the legion of insects: the striped flea beetle (control DDT); the cabbage green worm, cabbage looper, diamond-back moth (treatment with pyrethrum, rotenone or arsenical sprays); cabbage aphis (DDT, nicotine fumes, rotenone, nicotine-lime); thrips (DDT). For whiptail, tipburn, and diseases of malnutrition the controls indicated include fertilizer, lime, borax, magnesium.

Beans: Anthracnose (black canker on pods)—fermate spray, 3 to 6 year rotations, cultivation, clean seed, and resistant varieties; bacterial blight, caused by 6 different varieties of the pseudomonas group; mosaic, a virus disease—resistant varieties; seed corn maggots, attracted to newly plowed fields where there is (fresh) decaying organic matter; flea beetles—Bordeaux, arsenic compounds, DDT; leafhoppers—DDT; dry root-rot, carried with the straw and spread with sheep manure when the sheep are fed on bean straw—six-year rotation, no beans on said manure; downy mildew, pod spot and leaf blight—copper sprays; mexican bean beetle—rotenone, derris, etc.; bean weevil—fumigation with carbon bisulfide.

Dear Reader: You have here only the beginning of a long horror list of pests and diseases, and of poisons. Rest assured that the theme is not at all exhausted as yet. Excellent government leaflets will inform you about all the details of these so I will not take your time by recounting all of them. A summary of the situation may suffice to tell you just how much trouble you may encounter, sooner or later, in your garden.

Peas: 4 kinds of fungus diseases, at least 2 kinds of insects; treatment again, copper, rotenone, arsenic, nicotine, lime.

Spinach: 2 major insects (aphis and leaf miner); mildew.

Lettuce: 5 major diseases.

Cucurbits: 10 major diseases, 3 major insect pests.

Onion: smut—here two more chemicals are introduced, methyl cellulose and formaldehyde; two more frequent diseases, two more insects—another new chemical, tartar-emetic plus sugar, against thrips.

Tomato: cutworm, aphis, flea beetle—another new chemical namely fluorine compounds, 0.02%; blight, bacterial canker; large green worm on foliage; ripe rot, leaf-mold, bacterial spot, mosaic and streak, late blight, blossom-end rot. The tomato seems particularly "fertile".

Carrots: blight, rot and rust-fly (another chemical—napthalene).

Celery: 5 major diseases, two bugs.

Sweet Corn: smut and Stewart's disease, earworm and borer.

Eggplant: wilt, blight, and aphis.

There are many other troubles, in addition, such as the nematode or eel worm, and other insecticides and fungicides like the fluosilicates, cryolite, pyrethrum.

Before me lies the price-list of our local farm cooperative listing 65 different sprays, dusts, compounds, stickers, emulsifiers, synthetics, seed treatments. The total value of these ordered in the smallest obtainable quantities, is about $259.26. You can spend that much, *at least*, if you are pest, insect, and chemical control conscious.

If you are an organic and biologically-minded gardener, certain thoughts and doubts may already have arisen in you. Something must be utterly wrong with our modern production

methods if things have gone so far. Our soil, which is after all the basis for growth, has become ill too. It is nature's own true domain to grow healthy and resistant organisms. It was man's monkey business with nature which has caused trouble. Maybe his thoughts and approach to the problem contain shortcomings or a state of mind which deals only with one side of the problem and not with all sides. If several hundred people in a city suddenly showed up, infected with bugs, lice and fleas, the Health Department would get alarmed and take steps to eradicate the little bugs, lice and fleas. It would go one step farther, however, it would study the conditions under which such pests can develop, it would try sanitary measures, eradication of slums, of malnutrition, all conditions which contribute to the spreading of such pests.

Our modern production methods have made "slums" out of our soils and have caused malnutrition and unsanitary conditions in soils and plants —too crowded, too one-sided, too little light, etc. In short, the proper biological conditions have been neglected.

The state of mind of research and experiment stations, infatuated with "war" psychology rather than with peaceful development and growth, is all out to *kill,* kill the bug, kill the bearer of disease, instead of improving the conditions so that such occurrences cannot take place. When the "kill" is easy, as with arsenic, lead, fluorines, nicotine, it has been preferred to biological measures. Only in cases where the poisons did not work has one consented to investigate conditions under which pests and diseases would not spread and infect plants and soils. Only here, do we learn that cultivation methods, crop rotations, the avoiding of fresh manure and raw, rotting materials have an influence upon the situation. Only here, do we learn that fresh manure may help to spread fungus and disease germs, that raw compost may carry fungus and virus diseases, that one should not plant the same plant in the same place again for a period of from four to six years.

Biodynamic and organic gardeners have known, for more than 15 years, that diseases in soils and plants do not spread as much as they would otherwise if rotted and composted manure and plant material are applied. They have also known that malnutrition does not occur in a living soil fertilized with neutral humus and enriched with organic matter. In a balanced soil nematodes, for instance, are beneficial and do not become malignant and attack roots. Plants develop resistance. All future research ought to concentrate upon these questions of the natural health and resistance of a balanced soil. Then one would discover—which at present is known only by some practicing farmers and gardeners—that humus building organic methods are *preventive* medicines We should go out, not to kill, but to heal.

There is, however, another question connected with the application of poisonous sprays and insecticides, a problem which is of interest not only to the gardener but to every single human being in his role as consumer. It is a problem people shy away from discussing in scientific papers. He who brings it up makes himself most unpopular in certain circles and is considered to be an opponent of the "progress of science". Years ago I first met this problem when neighboring farmers came to buy potatoes from me because they preferred eating "natural", untreated potatoes instead of the ones they grew themselves using intensive fertilizers and sprays. Twenty years ago, already, we grew such "natural" potatoes in accordance with the *organic,* biodynamic method. We have to admit that, at present, organic methods are not yet able to prevent all pests or diseases since it takes anywhere from four to ten years to depoison and regenerate a soil. Then too, we still have to rely upon seeds coming from outside. However, there is evidence that greenhouses, using

home-grown (organic) seed and well treated and rotted compost, were kept free from disease over a period of ten years.

This result was obtained in the writer's truck garden in Loverendale, Holland, before the war, with tomatoes, lettuce, cucumbers, cabbage, cauliflower, and grapes; a promising test which has been completely destroyed by the war. There is also the witness of the Dutch government experimental station in Zutphen, where it was demonstrated that grains, which had been treated with well-rotted manure and compost, remained free from root and stem rot (a fungus infection) in contrast to those which had been treated with fertilizers, raw manures, and compost. Harmful insects and fungi may still be present, but they do not spread, as was also seen in the case of strawberries and other fruits.

Insecticides and fungicides may be divided into two groups: (a) sprays and dusts containing metallic poisons, such as arsenic, lead, fluorine, copper, mercury; (b) sprays and dusts containing organic poisons, such as rotenone, derris, nicotine, and other partially synthetic products.

If one is forced to apply any of such poisons the questions arise: (1) Do they harm the microlife of the soil? (2) Do they stick to the food products to be consumed when the vegetables are eaten?

Metallic poisons are indestructible and stay with the products, to some extent, besides remaining in the soil. Years ago copper sulfate sprays were applied to vineyards abroad one to three times a year. Now up to 14 sprays per year must be used. The "bugs" have become resistant and new forms have developed. When large amounts of metallic poisons are used, there is no doubt that measurable quantities can be recovered from soils, particularly from poor, mineralized soils. Orchards and vineyards can be seen, where the earthworm population has disappeared. Science owes us thorough tests to prove the presence or absence of microlife in the soil and the harmlessness of metallic sprays, if absorbed by the soil. Not much has been done in this field as yet. However, we know from practical experience that metallic poisons can be absorbed by neutral, colloidal humus, i.e. organic matter in a living state, and rendered harmless as long as there is no excess. Leaf-mold compost has proved to be particularly effective as a depoisoning agent. On the other hand, the author has supervised composting experiments where leaves, which had been intensively sprayed with copper sulfate and arsenic, did not rot at all in compost heaps. Caution is required in these matters. Copper and arsenic compounds adhere to fruit. The other day I bought some apples which had visible deposits on the stem and blossom ends, deposits which could be scraped off with a knife. Some shippers wash the fruit with diluted acids in order to remove them and spray the fruit afterwards with protective coatings of oil and paraffin. Twenty years ago, the French Government rejected shipments of American apples because they contained measurable amounts of copper, arsenic and lead. Pests have become so abundant that the authorities had to increase the tolerances for poisons. "The present tolerances permitted on apples and pears are 0.025 grain (about 0.0016 gram) of arsenic trioxide and 0.05 grain (about 0.003 gram) of lead for each lb. of fruit and are approximately *double* the amounts permitted in 1939 . . . A tolerance of 0.02 grain (about 0.0013 gram) of fluorine for each pound of fruit is also permitted." We read the above quotation in bulletin 473, January 1942 (reprinted 1944) of the New York State College of Agriculture at Cornell University, Ithaca, N. Y. It is not that the poisons have become less poisonous, but there was no other way out.

The lethal dose of arsenic is 0.1 gram; 0.03 gram of arsenic cause intestinal cramps and cholera-like symptoms. 0.025 grain per pound of apples

amounts to one-eighth of the poisoning dose; in other words, 18 apples a day would cause poisoning. If someone follows the old saying "an apple a day keeps the doctor away" what might the result be? One apple (¼ to ½ lb.) a day, or about 150 to 180 lbs. per year, would result, according to the tolerance, in an annual intake of 0.24 gram of arsenic, i.e. two and one-half times the lethal dose. However, the intake is spread over a long period, and a peculiar property of the human body is that it adjusts itself to arsenic so that the body tolerance can be increased to 0.5 gram. Part of the arsenic is excreted again with the urine, but much can be stored in inner organs, bones, and hair. A state may be created, lying somewhere between normalcy and poisoning, which is not regarded as illness but manifests itself in increased irritability and wear and tear.

Fifty years ago, Swiss mountain guides used to "eat" arsenic because of its stimulating effect which lasted for a while, but caused heart trouble later on account of the increased stimulation. It was then forbidden. Race horses were "fired" with arsenic, which is forbidden. Traces of arsenic can be found in the hair around the legs of horses treated in this way, and they are then disqualified.

Lead, even in small amounts, is absorbed by the human body causing insidious but creeping effects. Painters, who use lead paint, can tell of these; weakness, muscle spasms, nerve paralysis, bad teeth may result.

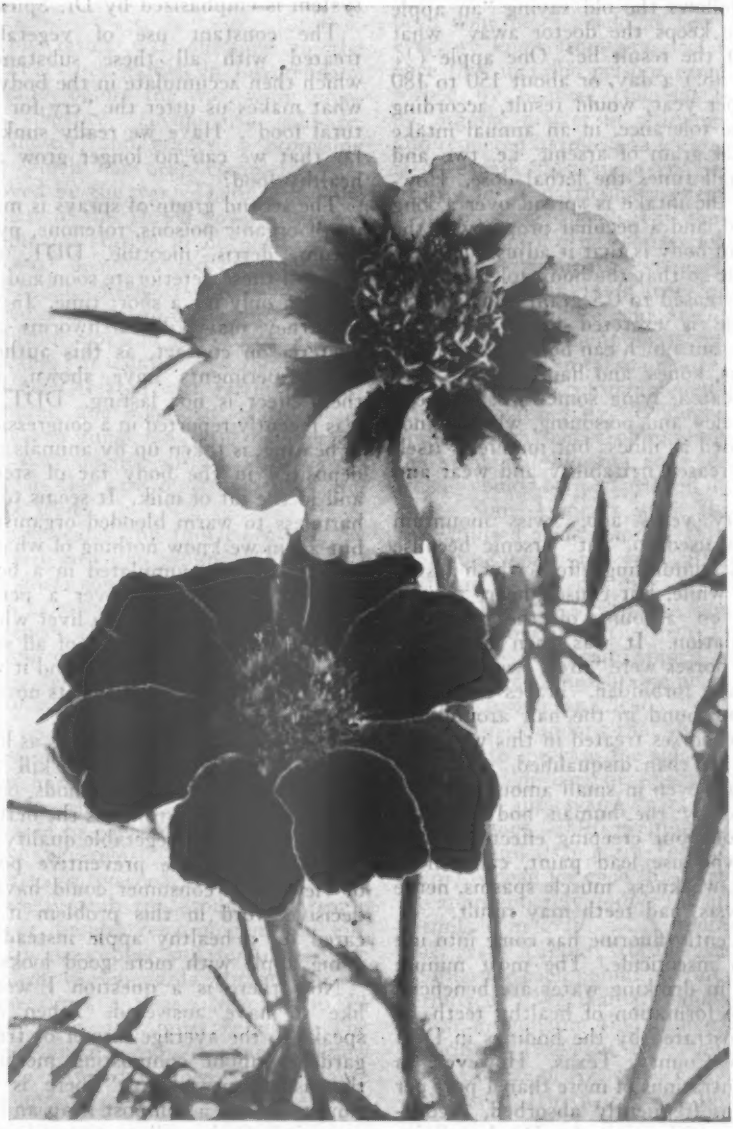
Recently fluorine has come into use as an insecticide. The most minute doses in drinking water are beneficial to the formation of healthy teeth, as demonstrated by the findings in Deaf Smith County, Texas. However, in concentrations of more than 1 part per million, frequently absorbed, according to publications by Dr. Leo Spira of London, England, it can cause disturbances, particularly of the parathyroid gland, followed by a reduction of the calcium content of the body, mottled teeth, fragile bones, and other symptoms of chronic fluorosis. The similarity of arsenic and fluorine disturbances of the vegetative nervous system is emphasized by Dr. Spira.

The constant use of vegetables treated with all these substances, which then accumulate in the body, is what makes us utter the "cry for natural food". Have we really sunk so far that we can no longer grow any healthy food?

The second group of sprays is made up of organic poisons, rotenone, pyrethrum, derris, nicotine, DDT, etc. Some of these deteriorate soon and are harmful only for a short time. In the soil, they may kill earthworms and bacteria on contact, as this author's own experiments have shown, but their effect is not lasting. DDT, as was recently reported in a congressional hearing, is taken up by animals and deposited in the body fat of steers, and in the fat of milk. It seems to be harmless to warm blooded organisms, but again we know nothing of what it may cause if accumulated in a body through constant use over a period of years. Usually it is the liver which has first to bear the brunt of all substances foreign to the body, and it will probably be handicapped in its normal functioning.

There is no escape nowadays as long as the mental orientation "kill the bug" exists. Biological methods, only, will turn the wheel towards the betterment of fruit and vegetable quality by bringing about the preventive point of view. The consumer could have a decisive word in this problem if he cared for a healthy apple instead of a big apple with mere good looks.

Now there is a question I would like to have answered. When one speaks to the average farmer or truck gardener about composting methods the usual answer is: "There is no time to set up a compost heap and to move it." Or he will protest: "It will mean handling the manure twice, etc. etc." Why is there time to buy, pay for, and use all the sprays, all operations which, in my experience, take more time than compost handling?



Single fertile hybrid Marigold WILDFIRE —Burpee

So Now We Know

ONE USE FOR SULPHATE OF AMMONIA

Reprinted from "The Compost Society Magazine," (New Zealand)

The Wellington "Evening Post" of July 2 contained an article that made us turn the paper upside down and see how it read that way. Then we had another look, and began to see daylight. We had been mistaken. The thing made sense all right. Certainly it did.

THE title of this article was "And the Green Grass Grows All Round . . ." (or "Around," as we say in English). But, in spite of this little slip, it was written by a very good journalist, and we have no adverse criticism to make from that point of view. It was well written and well presented.

Perhaps the best thing we can do is to quote at some length from the article itself. It began this way:

"The rain was pouring down at the Manawatu Bowling Club's greens last Friday afternoon. Around one green stood a party of members of the New Zealand Bowling Council who, through a generous gesture by Mr. Andrew Fletcher, had shortly before paid a visit to the Greens Research Area trial plots at Hokowhitu. Everything was soggy and wet. Suddenly Mr. E. Bruce Levy, Director of the Greens Research Area, who was guiding the party round, said: 'Will you step on to the green, gentlemen?'

"To put it mildly the bowlers were surprised. Even though earlier in the day they had seen evidence of the way in which firm, non-soggy turf could be grown, they were still chary of stepping on to the beautiful green before them, soaked with the heavy rain. Taking Mr. Levy at his word, they stepped in their ordinary shoes on to the wet turf. It was firm and smooth, with nothing of the squelchy softness which might have been expected of grass after such a downpour."

Having read as far as that, we were completely unprepared for what was to follow. After describing the difference between the "grass" bowling green and the "weed" green, the writer went on as follows:—

"The establishment of a fine grass green is not a matter of straight-out fertility-building—that is where so many people make a mistake. After all, it is not a pasture that is required. That is where most of the pitfalls come in. What is needed is a fine, hard-wearing turf, not analogous to pasture.

"Many greenkeepers and members of the bowling club committees are retired farmers, and a good deal of the practice which went into the making of pastures on the farms has been translated into the building of a golf or bowling green. According to Mr. Levy, the principles are diametrically opposed.

"For pastures you need a mixed association of plants—grass, clover and, in many cases, weeds as well—and you must have worms and considerable bacterial activity in the soil. In pastures you lime to sweeten the soil and to encourage this bacterial activity, thus decomposing the dead fibre in the earth. The bowling green turf, on the other hand, needs a strong fibrous layer just underneath the surface to give that strength and smoothness necessary for the hard wear it must receive. It must be free from worms."

Even at this stage we were still unsuspecting. The article seemed to be leading somewhere. But where? Was the writer leading us down the garden path? Well, in a sense that was not completely metaphorical, perhaps he was. And what he was about to do (perhaps inadvertently) was to let us have a glimpse of the garden Through the Looking Glass. We continue to quote:

"A good many of the plots at the Greens Research Area were started in

1932, and some of them are really museum pieces. Some have had the same treatment all through those years, and the cumulative effects, either good or bad, are clearly seen.

"After some of the principles of greens research had been explained to the bowlers by Mr. Levy, the party went out to have a look at the plots. They didn't appear very exciting.

"Appearances are deceptive, and despite the pouring rain the bowlers listened with increasing attention to what was told them.

"They were told how increasing the acidity of the soil destroyed the worm population, the weed population, and built up a fibrous layer by destroying, in addition, the bacteria in the soil.

"In greens where you want hard-wearing properties, it was explained, there must be present a certain amount of dead fibre near the surface. That fibrous mat is produced by acidity which keeps down the fertility of the green and at the same time rids it of the undesirable elements."

We could stop here. But it is too good to miss. Let us have some more:

"Mr. Levy said that after many years of experiments it had been concluded that the most satisfactory treatment for greens was 6cwt of sulphate of ammonia and 2cwt of superphosphate per annum per acre, applied at two-monthly intervals. This, however, was varied slightly according to location and other factors which had to be taken into account at various different points.

"He pointed out that sweetening fertilisers brought in weeds and worms as soon as they were applied in quantity, and they should not be so applied unless the acidity of the soil were overdone, and then only in such quantities as to correct the over-acidity.

"Side by side on the plots were two stretches of turf, one of which had been dosed with straight sulphate of ammonia for 14 years, and the other with straight superphosphate for a similar period.

"Both looked much the same, but when the bowlers walked across them the difference was immediately apparent. Despite the wet, the green dosed with the ammonia treatment was firm and clean, and a turf cut out showed a strong fibrous layer which was the secret of this condition. Another turf cut from the other green but a few feet away was soggy and squelchy, and the earth beneath was water-logged.

"All kinds of fertilisers have been tried out at Palmerston. Sods were cut from many plots, and the results of the different treatments were described to the bowlers. It was more convincing proof of the value of the scientific system than would be ten columns of explanations. What was demonstrably clear was that by means of careful planning those at the Research Area can, and do, produce the sort of turf that bowlers want."

So there you have it! Sulphate of ammonia destroys the worm population by increasing the acidity of the soil! And it destroys the bacteria in the soil, too! It "keeps down the fertility of the soil." (Manufacturers' advertisements, please copy.)

There was, of course, a good deal more that might have been said. For instance, it was noted that the plots that had been treated with superphosphate were "soggy and squelchy, and the earth beneath was water-logged." Ideally conditioned, in fact, for erosion. The crumb-structure of the soil nicely broken down so that, if it were on a hillside or a sloping pasture, the rainfalls of winter would be swilling it down into the gullies.

It may be noted, too, that although Mr. Levy remarked that "sweetening fertilisers" increase the worm population, no worm-count was made.

In fact, the gardeners of New Zealand owe a debt of gratitude to Mr. Bruce Levy for such a very convincing demonstration of the most effective way of destroying fertility in the soil, according to the "Scientific System." He is a recognised authority on grass and pastures, and we hope he will be listened to by the farmers and gardeners, as well as by the bowlers.

Healthy Humus and Animal Life

By ROGER W. SMITH

MOST organic gardeners know that the produce of their organic garden is good for them. It has high food value. They know, also, that organically grown vegetation is beneficial to the health of whatever animals they may raise. Usually the organic gardener manages to support a cow or a few pigs, perhaps some chickens or rabbits.

What is too often overlooked is the health value of good top soil, humus, and healthy vegetable material when not used as food-stuffs. Organically grown plants have food value, they also have very high value used in other ways. Too often we overlook the indirect ways in which organically grown vegetation may help maintain health in our farm animals.

Starting with the hog, almost the most common disease of this animal (next to rickets which is the direct result of lack of sunshine and almost inexcusable) is anemia. Anemia kills young pigs. A litter may be saved if the sow is given access to fresh sod, to healthy top soil.

If the brood sow must be brought and kept indoors then top soil, or better yet turves, should be supplied. Why should the domestic sow require healthy top soil? Unfortunately many of the peculiar habits of its wild ancestor are always cropping up in the domestic pig.

In the wild, hogs thrive in woodlands. They consume, with the roots they dig up, considerable quantities of humus. When the semi-wild razorback sow seeks out a place to litter it selects a comfortable earthy spot well cushioned with vegetation.

Mastitis, inflamation of the udder, is a very common disease in cows. In many herds it decreases the milk production by as much as forty per cent. Quite recent tests have shown that this disease was most prevalent amongst animals which were forced to rest upon cold, wet concrete floors.

Where shallow bedding was customary, the cow's ungraceful manner of reclining almost invariably caused the bedding to be kicked aside and the udder exposed to the cold flooring. By pen stabling the animal and providing it with a very deep layer of organic bedding mastitis was brought under control.

Domestic poultry are very choosy about the kind of vegetation which they eat and carefully select the material to form the nest. Someday someone will discover why domestic birds prefer to make their nests only in certain hidden spots and upon certain vegetation. It may be that they are able to detect the difference between slow-growing, natural grasses and those having rank artificial growth.

We know quite well the high dietary value of organically grown plants. What we are apt to overlook is that properly grown vegetation may be quite superior to all others and that this superiority may be demonstrated in other ways than in the diet; that the health of the vegetation may be demonstrated in its value as bedding,

that the health of the humus may be tested by its use in the hog pen.

This matter of superiority of animal bedding brings us immediately to sheet composting. Under wild conditions vast herds of animals rested overnight in a comfortable spot, whether they were African deer or American bison. Even the wild goat, a lover of rocky places, probably never chose a flat, dry, dusty rock upon which to spend a night; instead it sought out some small protected spot containing a comfortable cushion of dried vegetation.

Generally the animals rested in an area deep with lush grass. When the herd moved on the area was trampled and the herbage either consumed or pressed down and trampled into the hoof-prints of the animals. Some manure was given in payment for the damage done. Remarkably enough, under such treatment, wild vegetation thrived. Areas not visited by wild herds soon became eroded and rocky. Without the herd and its primitive sheet composting effect wild vegetation gradually failed. And the amount of time the wild herd spent in any given area depended upon two factors, the food value of the herbage and especially its ability to form a comfortable place in which to rest for the night. Thus in the wild it becomes apparent that the real test of vegetation is twofold, its value in the diet and its value as bedding.

However, that may be, the material the gardener uses in deep bedding his cow, the turves thrown into his hog pen, are not wasted. They are essential to the health of his animals; they are also later of much value in the compost heap.

In much the same way healthy humus and organic bedding is essential to the well being of goats, rabbits, chickens, ducks, geese, pigeons, etc., with different degrees and variations. Birds need grit, but note especially how much "battery hens" need green shoots. Even the caged canary enjoys a bit of lettuce. Then consider how serious the matter becomes if the green shoots or the scrap of lettuce lack the essential food value, because of its artificial growth, which the birds so eagerly seek, and which is so essential to them.

Note how carefully birds select the materials for their nests; note the care with which the wild rabbit selects its nesting-place. To supply your stock with suitable bedding will be a challenge to your skill and understanding.

If you succeed in providing comfortable bedding for your animals you will insure their health and comfort, you will do more than that—you will insure the fertility of your garden. For every scrap of bedding also has its important place in your composting plans.

Heredity In Russia

THE RUSSIANS who have quite an active body of plant physiologists and plant breeders, seem inclined to think that heredity can be influenced by the environment which exerts an influence on the physiological behavior of plants. These questions were discussed by P. S. Hudson and R. H. Richen in *The New Genetics in the Soviet Union.* (Imperial Bureau of Plant Breeding and Genetics, Cambridge, England.) The theories and methods of thinking of Lysenko are discussed on the basis of Russian source material.

Pesticides Prove Detrimental to Plant Health

By ROBERT RODALE

IN an article in the March-April issue of Farm and Home Research published by the Ohio Agricultural Experiment Station at Wooster, Ohio the detrimental effect of several of the newer pesticides on plants was shown by giving the results of experiments involving the use of both insecticides and fungicides. These experiments strengthened the case against poisonous sprays as destroyers of the fertility of the soil by showing that their application hinders plant growth. Cucumbers, potatoes, and tomatoes were experimented on in the greenhouses of the station.

Of all the insecticides used on cucumbers, the inorganic ones such as DDT, Methoxy, and Rothane caused much stunting and even death of some of the treated plants while those prepared from plant sources such as Sebacide, Derris, Ryanex, and Pyrocide, caused less injury in comparison. The experiments also showed that the organic fungicides (Zerlate, Fermate, and zinc ethylene bis dithiocarbonate) were less injurious to cucumbers than the inorganics, such as copper A, tribasic, and Bordeaux. However, the pesticides prepared from plant sources, especially the insecticides, did show considerable ill effects on the plants on which they were used.

In the experiments involving potatoes and tomatoes DDT was found to be the most selective. In most cases it caused less injury to potatoes than tomatoes, especially in the higher concentrations. Typical reactions by tomato and potato plants to the pesticides were—decreased size and health. Dithane, DDT, and Deenol caused particular damage to tomatoes while JP 70 and Bordeaux had the worst effect on potatoes. HCCH (Symmetrical hexachlorocyclohexane) was injurious to both potatoes and tomatoes, causing a definite chlorosis and stunting on the potato and producing a type of leaf injury on the tomato that resembled shoe-string mosaic.

A decrease of the water loss (transpiration) of the plants to which pesticides were applied was also noticed. This was probably the result of leaf injury by the compounds making it impossible for the stomata to function. In general, the insecticides caused a decrease in the transpiration rate while the fungicides allowed it to stay the same and there was a definite relation found between plant injury and water loss. The loss was also found to be progressive because the decrease in transpiration increased from day to day after the application of insecticides was made.

The men conducting the experiment also made observations of the relative efficiency of sprayed plants with good pest control and of unsprayed plants with imperfect pest control. They found that even though some plants were infested with insects they did better than those that were untouched by insects because of the effects of spraying. This one fact alone is enough to convince even the most avid supporter of "chemical" agriculture that there is something wrong with his theory. The experimenters themselves say that their findings "indicate strongly that the lack of correlation that frequently seems to exist between control efficiency and final yields is caused by the fact that chemical damage to plants can offset, or even overbalance, the beneficial effects of insect and disease control."

The organic gardener, who depends on compost rather than on the spray-gun, can watch his plants flourish with a deep satisfaction, knowing that their leaves can breathe healthily, that his plants do not have the daylights shocked out of them by being doused with poisons, that the small amount of insect infestation can be taken in their stride and that he will have more than enough food from his garden.

Earthworm egg-capsules shown in the hand.

"The Earthworm - Nature's Wonder - Worker"

By CHARLES H. CRANDON

Miami, Florida

AN article recently published in the press entitled "The Worm—It Turns", while very interesting, contributes nothing of scientific value, but it does create the impression that earthworms cannot thrive in South Florida's sandy soil—an impression we would like to correct.

If the author of the article in question had stopped to seriously consider her subject, she would have realized there is no need to experiment to determine whether or not the earthworm would live in dry, sandy soil. To expect the earthworm to live in dry, sandy soil is just as unreasonable as to expect the Orange or Avocado tree, or garden vegetables to do so. There is little that will survive in such soil. Even ordinary lawn grass will not prosper without moisture and fertilizer in this type of soil. With the exception of the Caribbean pine and Palmetto, there is nothing of value that grows in such soil. The Pineapple will struggle along in such soil, but this is because the Pineapple is a semi-air plant and secures 60% of its food

At work preparing material for the compost heap.

through the leaf. However, even the Pineapple will not prosper and bear fruit without moisture and fertilizer. Much of our sandy soil is very deficient in life-giving necessities, and whether it be the earthworm or plant life, they will not prosper under these conditions. However, by the addition of humus to the soil, and adequate moisture, one can create a veritable Garden of Eden. After the humus and moisture have been added, it is then time to introduce the earthworm. Therefore, others will begin their experiments where the author of the article in question left off.

There is an earthworm in New Zealand, on the other side of the world (and I hope a shipment recently ordered by me is now on the way) which is known to thrive in the hilly, dry soil of New Zealand. The purpose of importing this earthworm is to experiment in introducing it into the hot, dry soil of South Florida. It might very well thrive here, with only a small part of the food and moisture conditions that are required for the Florida and Brandling worm. The native Florida worm (and they are here by the millions) is very much larger than the Brandling, or California orchard worm, and much more vigorous. They introduced themselves into the soil on my farm, which was nothing but high pine land with dry, sandy, rocky soil. Where they came from, or how they got there, that is, the native worms, we do not know. But the minute we began to impregnate the soil with humus and compost and mulch, the worms came.

The possibilities of the earthworm here in Florida appear to me to be much greater than in most areas of the United States, because the earthworms thrive in warm temperatures. They propagate more freely, and the worm capsule, or eggs hatch more quickly in temperatures ranging from 70 to 90 degrees. In the north and west, where temperatures are low many months of the year, the earthworm does not reproduce, nor do the eggs hatch.

As many, many people have done before, this writer has taken acres of high pine, sandy, rocky soil, and converted it into a luxurious garden by adding humus and by mulching trees and shrubs. That is the perfect situation for nearly all plants, and is especially ideal for fruit trees. Without humus and mulch, such trees as the Avocado Pear, the Mango, and many others will not produce either the quantity, the size or the flavored fruit that one can raise by the proper method.

It is possible to plant trees in sandy soil, and to provide proper moisture, together with commercial fertilizer, and raise large, and in some cases, trees of luxuriant appearance. However, trees grown by this method are not to be compared in growth, luxuriant appearance or productivity to trees that are fed a proper and well-balanced plant food such as good compost.

By compost we mean a material made by the "Indore" method of laying down layers of vegetation, then a layer of muck, a small amount of rock phosphate, a layer of manure—preferably horse manure (grain fed), hen manure, and, in fact, many other manures, any of which have a large nitrogen content. The compost pile is well moistened throughout the process of its building. This same process of laying down these layers is done over and over again until the pile is about five feet high, ten feet in width and of any length desired. When this process is completed, holes are made in the pile, or the pile can be built around saplings of five or six inches in diameter, and then the saplings pulled out, leaving air holes, which are necessary for bacterial action, as the pile will create heat running from 150 to 155 degrees, especially if green material is used. Therefore, it will be seen that the compost piles should be kept very moist. After these compost piles have begun to cool off in about three weeks, the pile should be turned. They will then go through a second heat, at which time another microbe will take

over. In about five weeks after the first turn, the compost pile should be turned a second time, altho in this process no holes are necessary, as this third microbe that now takes over does not need air. When the compost pile has cooled off at the end of about three months it is then ready to be used, and here you have the finest plant food that man can make. We are now experimenting to determine whether or not we can use the earthworm to turn these compost piles (about 100 tons) instead of doing it by hand or machinery, by introducing into each pile not less than 100,000 earthworms. If this sort of compost is put around the trees, you have an ideal plant food, as well as ideal food for the earthworm. Thus you "kill two birds with one stone". Then look for miraculous results, for you will surely get them.

In the hot dry climate that we have here in South Florida, the roots of trees, except the Citrus, should be protected from the hot sun by the use of a heavy mulch. This mulch will keep the roots of the trees cool; it will protect the earthworms from heat and light; it will keep the roots of the trees moist for a much longer period of time than if it were not used, and eventually, not only the compost but the mulch itself will disappear into the soil. Both of these materials will be ground up completely by the earthworm, as they are vegetable matter. They will be thoroughly mixed by the earthworm, and will eventually be turned into earthworm castings or manure, which is a soluble fertilizer, and one of the best known to man.

Where earthworms are encouraged to live in this environment the top soil will become black with earthworm castings, and as the rains come or artificial watering is used, this water soluble manure washes right back around the roots of the trees. Not only this, but where compost and mulch are used, and the earthworm encouraged to live, the soil underneath will become as soft as an ash heap, and will not be the dry, hard soil that is so often found around poor, anaemic trees that are struggling to live. We know from experience that there is no comparison between a fruit tree that has compost, mulch and the earthworm, and a tree grown under the usual conditions in this area, where only moisture and commercial fertilizer are provided.

It is well known that a tree, as the human body, that is properly fed and in vigorous health, will resist diseases of all kinds. Therefore, the fruit tree or shrub that has its roots in an ideal situation as above outlined will successfully resist scale, scab and many of the other diseases with which so many trees, as well as garden vegetables, are so often covered. And so often are destroyed by such diseases.

We have raised all types of garden vegetables, such as tomatoes, potatoes, carrots, onions, and many others, with surprising yield and unusual flavor, with no fertilizer other than the home made compost. Added to this is the work of the wiggling chemist below the soil—the earthworm, which is constantly churning up the earth—mixing it with this fine compost and mulch, until the very soil itself, which was once white and sandy and without any food value whatsoever, becomes an exceedingly fine soil of great productivity. It was Charles Darwin who said: "The earthworm has probably done more for mankind than any other living animal." And it can do it right here in Florida.

The author of the recently published article admits that she had a Jasmine bush which failed to grow or bloom, which reacted in a magical way after she had placed earthworms around it. This same transformation will occur in a vegetable garden and with any fruit tree or shrub under the same treatment. Nothing in this world will grow, including the human body, without food and water. As a matter of fact, there is little in vegetation that can be introduced into the sandy soil of Florida and be expected to produce or even survive. There are very few exceptions, such as the Cac-

tus family, and the Horned Toad of the desert. However, by and large, everything in nature and in life must have moisture and food. A fine well-balanced food is also required by the earthworm, which he transforms into a rich fertilizer.

If the author of the article referred to could have visited our farm about two weeks ago she would have seen Gardenia bushes planted in the earth (not a tub)—she would have seen single Gardenia bushes with as many as 500 perfect blooms. She could have seen beautiful specimens of the Chinese Lychee Nut (Litchi chinensis), the Macadamia ternifolia Nut and the most luxuriant Avocado trees to be found in this state—and where once there was only dry, white sand. Under all of these trees there are thousands of earthworms at work.

The earthworm is nature's own chemist—her plow and cultivator—her fertilizer and food distributor in the soil. If this be true, then we should aid and assist the earthworm as we aid and assist the trees and plants and vegetation.

All vegetation ultimately returns to its original form, and is broken down by chemical action and the earthworm. These elements, often unavailable to plant roots, are broken down in this manner and made available. Since the beginning of time the earthworm has been nature's perpetual soil builder. He consumes the animal and vegetable matter, grinding it up with tiny particles of sand in his gizzard (he has a crop and gizzard just like a chicken), together with minor minerals of the earth, brought up from below, and mixes all this with glandular secretions, and deposits these castings (manure) on the surface of the ground (by some species below the surface of the ground) around the roots of the trees.

Altho I have never eaten fried earthworms, nor do I suggest such a dish, I have, in my travels, seen them served in such manner and eaten. Let anyone who finds such a suggestion repulsive contemplate the contents of the much sought after clam and oyster, which is filled with mud and slime from the ocean's floor.

The earthworm was originally a water animal, and must have moisture. Our pine land does not hold moisture, and at some seasons of the year we have long dry spells. That is why artificial irrigation is so generally used. However, with the addition of humus and water, we can produce bountiful crops and wonderful trees. And millions of earthworms—right here in our sandy soil.

An earthworm culture setup consisting of stacked up tiers of vegetable lug boxes. Such lug boxes are light in weight, quite strong and durable, and are perfectly adapted to the breeding of earthworms.

General view of the Vegetable Rock Garden, showing the stones between the trenches filled with compost in which the vegetables are growing.

Hints From the Gardener

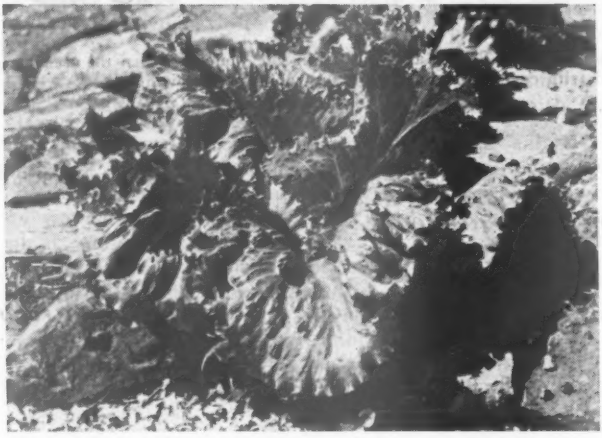
The Stone Vegetable Garden

By RAYMOND GREEN

LOCATED on the outskirts of Emmaus, Pa. is the Rodale Organic Farm where thru experimentation and research, new and better methods of gardening are found and proven. One of our experiments is a rock garden made for the purpose of growing vegetables in compost. This rock garden has proven beyond a doubt by the results obtained that this method of gardening produces earlier and better crops. The early planted vegetables grew faster not only because of the compost used, but because of higher soil temperatures maintained due to the heat absorbed by the rocks during the day. The rocks also helped conserve soil moisture. What effects this will have on the longer growing and late crops will be noted in a later issue.

This rock garden is composed of sections of stone, which are two feet wide with a twelve inch space between for a bed of compost approximately six inches deep. There are four beds of thirteen rows each, the rows being fifteen feet long. Between each bed is a three foot wide path covered with crushed half inch ornamental green stone. This crushed stone adds color to the garden and keeps the weeds

Copenhagen Market Cabbage, planted April 19, 1947 Photographed June 9, 1947.



Imperial 44 Head Lettuce, planted April 19, photographed June 9 1947.

Tendergreen Beans. Seed planted April 30. Photographed June 9.

Laxton's Progress Peas. Planted April 10, photographed June 9, 1947.

from growing in the paths. Before planting each bed, a top dressing of one third each of ground limestone, rock phosphate and bone meal was applied at the rate of 15 pounds per bed or one pound per 45 square feet. This mixture was broadcast over the rocks as well as on the compost rows to be planted. After top dressing it was only necessary to hoe each compost row to a depth of two inches, rake level and firm with the back of the rake. In order to make planting easier and have straight rows a board one inch thick, six inches wide, and three feet long was used. If the seed being planted required a shallow furrow ¼" to ½" deep (lettuce, beets, carrots) you start at one end of your compost row and push the board lightly thru

the center. When 1" to 1½" furrows are needed as for beans and peas, you obtain your depth by going over your mark twice. For transplanting, just make a mark. Nailing a two inch strip in the center of your board for marking makes it easier to firm the ground after your seeds are planted, makes it look nice too. You know working in soil of this type is a pleasure. It's easy to work as the ground is always friable and loose. When you plant into it you just know its got to grow.

Peas were the first to be planted. Blue Bantam and Sugar Peas were planted March 20, and Laxton Progress (dwarf type) on April 10. The vines were vigorous and dark green in color. Blue Bantam peas were harvested on June 16 with pods 3" to 3½" long with 5 and 6 peas per pod. Laxton Progress was harvested June 18 with pods 4½" to 5" long having 7 and 8 peas per pod. Sugar peas were harvested from June 23 to June 30. All vines were pulled out and put into the compost pit. The nodule formations on the roots measured ¼" in diameter and were in ball formations indicating excellent bacteria growth. The bacteria in these nodules take nitrogen from the air and make it available for plant growth.

Studying the size and number of nodule formations will determine whether the soil conditions are right for bacterial growth. There were thirteen rows of peas that were replanted to second plantings of White Icicle Radish, Black Seeded Simpson Lettuce, Parsley, Stringbeans, Kale, Late Danish Ballhead Cabbage, Lima Beans, (Early Market and Fordhook 242) late red beets (Detroit) and late cauliflower, (Snowball). The above were planted from June 20 to June 30. Parsley seed was soaked in water 24 hours before planting. Parsley planted this late will grow nicely till fall and will winter over and produce good parsley next spring without going to seed.

The variety of carrots planted was Imperator which were thinned to 1" as soon as the true leaves appeared. The reason for thinning early was to enable the tap root of the carrot plants to develop a straight root. Delay in thinning will cause deformed roots due to overcrowding. A good rule to follow on all vegetables that require thinning is to thin as soon as the true leaves have formed. Seed was planted on April 12, and the first carrots seven to eight inches long, were pulled on June 28.

Detroit Dark Red Beets were planted April 12 and thinned to 1½" apart when plants were 3" high. The plants thinned out were transplanted. Small beets 2" in diameter were pulled on June 24. Every other beet was pulled first leaving the remainder to grow to a larger size.

Head lettuce plants, Imperial No. 44 and Great Lakes varieties were transplanted 1' apart April 29 and covered with hot caps. When the leaves of the plants were shoving the hotcaps up, the hotcaps were removed. Imperial No. 44 heads were darker green and earlier than Great Lakes. The first heads of Imperial No. 44 were cut on June 10 and Great Lakes on June 18. Heads of Imperial No. 44 averaged 1¼ pounds each and Great Lakes 1½ pounds each. Several heads of each variety weighed 2 and 2¼ pounds each. The surprising note was that the heads after becoming hard enough to cut, did not go to seed, even after 10 to 14 days when the last of Great Lakes was cut on June 28.

Copenhagen Market Cabbage and Snowball cauliflower plants were transplanted on April 19, and covered with hotcaps. Plants were in flats and were left outdoors to harden off one week without watering, during which time there were several heavy frosts. These plants had that blueish tinge in the leaves and stems that well hardened plants should have. The first heads of cabbage were cut June 15. The heads averaged 4 lbs. each, the last heads to be cut weighing 6 to 7 pounds each. Cauliflower was tied on June 16 and the first heads cut June 23. Cauliflower matures unevenly, depending

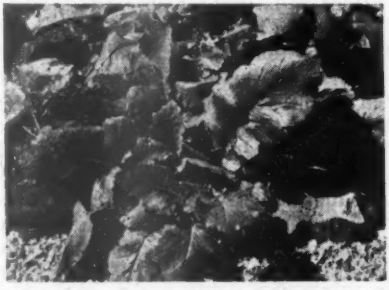
on weather conditions. When the small heads start forming (3" diameter) tie the leaves together as close to the top of the plant as possible. If you tie too close to the head it will interfere with the growth of the cauliflower. One week after tieing, your cauliflower should be ready to cut. Use different colored string each time you tie and cut your heads accordingly. This only applies to small plantings. On large plantings binder twine and raffia are used and the heads observed before cutting. Both the early cabbage and cauliflower were free from worm injury. To keep the last heads of cabbage from cracking, the plants are twisted or turned to break some of their roots. You can do the same thing by cutting half the roots with a spade or deep cultivation. After the above treatment, the outer leaves on the heads of cabbage itself become dried. These dried outer leaves preserve the head until cut, and a little trimming is necessary.

Stringbeans, (Tendergreen, Pencil Pod Wax) were planted on April 30. When something grows fast you have a tendency of referring to it as 'growing like a weed". These bean bushes grew faster than weeds. The bushes were immense in size, two feet tall and covered the rock space between the rows completely. The first beans were picked on June 27 and a little more than a full bushel was picked from each of the fifteen foot rows.

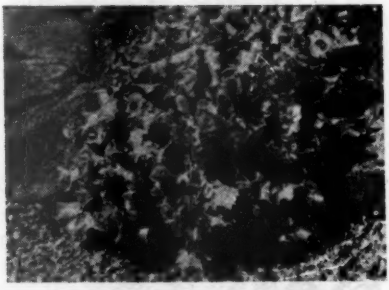
Radishes (Comet) were planted May 7. A double row, four inches apart, was planted in the twelve inch compost space. Twenty seven days later on June 2 the first radishes were picked. The radishes remained solid and were not strong when the last were pulled ten days later.

The above is a summary of the crops planted and harvested up to the end of June. After a crop is harvested, additional compost is added to the compost rows and also between the rocks where needed. By keeping the spaces between the rocks filled with compost, to the top height of the rocks it was found easier to control weeds. The weeds that do come up can readily be pulled out, roots included. One of the advantages of the rock garden over field cultivation was the ease of harvesting. Regardless of weather conditions you could harvest in the rock garden. No plowing and very little hoeing is necessary. Cultivation was only a factor for controlling weeds. Don't cultivate when there are no weeds. Vegetables growing in the compost rows needed only one cultivation and that just after they came up.

The pictures shown here were taken on June 9, and give you a natural illustration of the results of this type of gardening.



Purple Top White Globe Turnip. Planted April 30 and photographed June 9, 1947.



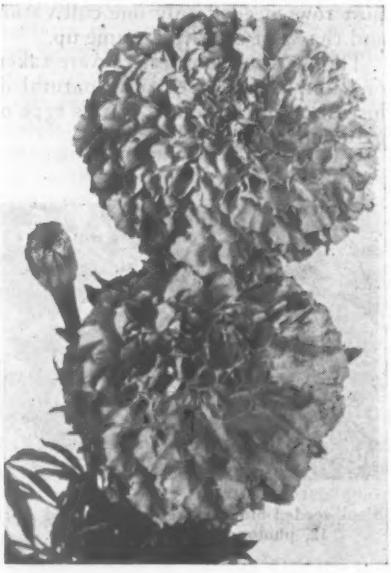
Black seeded Simpson Lettuce. Planted April 12, photographed June 9, 1947.

General Botany

DR. WILLIAM H. EYSTER

WE have had numerous requests from our readers for some general knowledge about plants as living organisms. Many people, for example, are unaware of the fact that fertile soil normally contains vast numbers of bacteria, various fungi, protozoan animals, earthworms, insect larvae, and numerous other organisms. These soil organisms can live only in soil that is rich in vegetable matter. The life of higher plants is intimately tied up with these soil organisms. In many cases the fungus hyphae grow into the roots of our food plants, an association that is known as a mycorrhiza. These mycorrhizal associations are intimately concerned with the nutrition of the higher plants. Our readers would like to know something about the structure and function of these soil organisms. It is only when we are fully conscious that the soil is really living that we appreciate the importance of adding vegetable matter to the soil. It is the vegetable matter that serves as foods for the soil organisms. Then too, organic gardeners want to be better informed on the structure and function of the various organs of the common garden and crop plants. Another relationship that deserves our attention is that which exists between plants and insects. In our gardens we practise monoculture, while in nature plants almost invariably grow in mixed cultures which seems to be better. What mixtures are compatible for best plant growth? What mixtures mutually repel insect pests? To answer the many questions of our readers, and to acquaint them with some of the fundamental principles of plant life, the Managing Editor is planning a series of articles concerned with plant life. The first of these articles will be concerned with the Early Beginnings of Plant Study as a Science and will appear in the November issue of this magazine.

Burpee
Double Hybrid Marigold



Burpee
Carnation-flowered Marigold

Garden Calendar—October

October, for plants, is the season of fulfillment. Seeds and fruits are ripening, twigs and buds are hardening and being covered by wax or hairs to insulate them against the conditions of winter which are unfavorable to growth. Man and the animals which live in our midst in winter must make provisions for food, but the plants have provided abundantly and all they need do is to take the food and store it. We gather and store our fruits and seeds with a thankful heart. In imagination we see our next year's garden with all the mistakes of our present garden eliminated. All plant wastes should be removed from the garden and incorporated in your autumn compost heap. Plant stakes should be stored in a dry place. All garden equipment should be carefully cleaned and stored.

THE NORTH

Preparation of the Soil:—After all plant materials have been cleared off, the soil should be leveled and given a liberal coating of humus which should be worked into the surface layer. This treatment will enable you to prepare the soil and plant it much earlier in the spring. If the soil is infested with cutworms or insect larvae, as Japanese beetles, it will be well to expose them to the winter cold by spading the garden in the fall before adding the compost. It is not too late to sow the ground thus prepared in winter rye which will provide additional organic matter to be worked into the soil in the spring.

Fall Planting:—October planting is not recommended for the northernmost states. In other states deciduous trees and shrubs, and hardy perennials may still be planted.

Preparation for Winter:—Rhododendrons and azaleas should be mulched with leaves. In the northern states Hybrid Tea Roses should be hilled up with soil 12 to 15 inches deep before the ground freezes. After the ground has frozen, cover the tops of the rose bushes with old hay, evergreen boughs or other plant material that will not pack too tightly. Climbing roses should be laid on the ground and covered with from 3 to 6 inches of soil and a little mulch over the soil. Pot and move inside any plants that you want for winter bloom. Give the evergreens a good soaking with water, especially if the soil in which they are growing has become dry. Store your root crops as well as the roots and bulbs of flowering plants in a cool, dry place, preferably in dry sand. Bulbs or roots of spring-blooming plants may still be planted.

THE WEST COAST

Fall Planting:—This is bulb-planting time. Great care should be exercised in the selection of the bulbs. In planting, make flat-bottomed holes so that the bulbs are in contact with the soil and not suspended over the v-shaped bottom of the hole. Bulbs which appear dry and worthless-looking should be soaked in water for several hours before planting. All bulbs must, of course, be planted with the stem side up. If gophers are a pest in your region, the roots of Oriental Poppies as well as the roots and bulbs of other plants can be protected by the use of wire screen baskets. Anemone and Ranunculus tubers should be soaked in water until they are plump before planting.

THE SOUTH

The Lawn:—If you have not already planted your new evergreen lawn, you should do so without delay. It is essential that the lawn should be well established before freezing weather. For best results use Italian Rye Grass with some Dutch White Clover. This seed mixture can be sown in a Bermuda Grass lawn which has become brown, but the Bermuda grass should be raked off and a liberal application of compost worked into the surface of the soil. By so doing you will have a beautifully green lawn during winter and spring months.

The Flower Garden:—This is perhaps the best month to plant spring flowering bulbs—Narcissus, Tulips, Hyacinths, and Peonies. For best results with Pansies, it is suggested that northern-grown seedlings be used. By planting them this month they will bloom profusely in January. Delphiniums, which behave as annuals in Florida, should be planted in October. Poinsettias should be staked to protect them against wind damage. Give your Dahlias a liberal application of compost to prepare them for their great burst of bloom next month. Why not organize a Dahlia show in your community?

The Vegetable Garden:—All cool-season vegetables can be planted this month. In order to give them a good start before cold weather, put about an inch of compost in the bottom of the furrow and sow the seeds along side the compost. Hotbeds and cold frames should be made ready for use next month.

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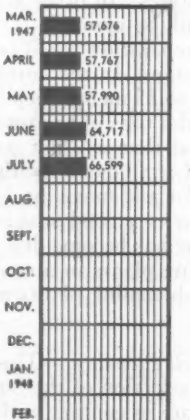

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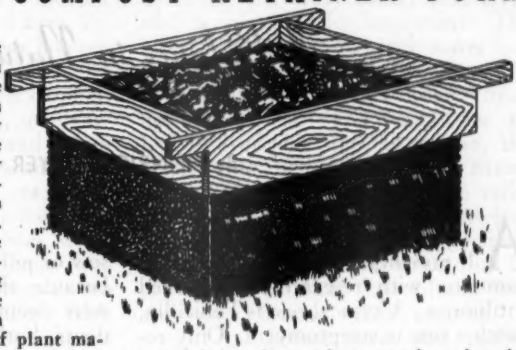
For the Organic Gardener

LIGHT-WEIGHT COMPOST RETAINER FORM



The compost heap can be made an object of beauty as well as a joy forever by using this simple device which any handyman can easily construct. It is made by fastening by nails or otherwise four 12" boards, with the longer boards having extensions on opposite ends to serve as handles in operating the compost retainer. All surface materials should be cleared away and the soil loosened and leveled where the compost heap is to be made. Now place the compost retainer in position and put into it a 6-inch layer of plant material. As an aid in measuring layers, the inside of the retainer can be marked off in inches. Then two inches of fresh manure, a sprinkling of pulverized, raw limestone, and finally a thin layer of soil. These layered materials can be gently stamped so that the heap will retain its form as the retainer is pulled upward as each layer is made. When the heap is completed the retainer can be removed and used for building other heaps.

SUCCESSFUL WINTER STORAGE

Winter storage of fruits and vegetables is often a problem with America's farmers, but here's one easy way it can be solved.

All that's required is an ordinary section of vitrified clay pipe, some gravel screen and a little muscle applied to a spade or shovel.

First, get a section of clay pipe from your building supply dealer, hardware store, co-op or other local source of supply. Its internal diameter should be close to 24 inches. Then select a spot close to the house on the north or east side, preferably where there is shade during the day. Dig a hole wide enough to accommodate the clay pipe and deep enough for the entire length.

In the bottom of this hole, stand three eight-inch bricks on end. These are for the pipe to rest on and keep it firm and level. Before you lower the pipe, spread two inches of coarse gravel or cinders on the bottom of the hole for drainage. Lower the pipe into the hole, setting it on the three bricks. Snug the dirt up around the top of the pipe so that it is flush with the ground. For best results, the top of the pipe should come two inches above the ground with dirt sloping away from it.

A cover, which will keep out rodents, can be made from half-inch gravel screen. Over the top of it put three or four inches of leaves or straw and on top of this insulating material, put something to hold it in place and to keep out water. A wood or metal lid will also help to waterproof it.

Farmers using this type of storage pit have reported that foods are safe when temperatures drop to 15 to 25 degrees below zero. This one section of clay pipe will afford plenty of room for a lot of fruit and vegetables, but if your supply is particularly large, simply use more storage pits as required. Not only will such a storage bin be useful in the wintertime, but it can be used in the summer for storing eggs, milk, butter and other perishables.

Drawing shows method of installing section of vitrified clay pipe for use as storage pit for fruits, eggs, milk and vegetables. Note that bell rests on bricks. Spigot end should protrude above ground 2" so dirt fill will slope away from opening. At bottom is layer of coarse drainage material. Top opening covered with gravel screen or with wood or metal lid.

Balance in Nature

By HEINRICH MEYER

At present, many laboratories are humming with research on so-called antibiotics. A typical one is Penicillin, another one is streptomycin. Only recently a very promising discovery was reported from the Department of Plant Pathology at the University of Wisconsin, where Professor Keitt and Curt C. Leben discovered a streptomyces which killed off a considerable number of infecting fungi that are found on the leaves of apple trees. One part of the acting substance excreted by this new species will be effective in a solution of from 8 to 10 millions against different plant pests. The strange thing, however, is that this substance leaves most bacteria alone. In other words, bacterial diseases will not be affected by this streptomyces.

Such substances are called antibiotic. Practically, this means that in the world of minute living beings, usually small microscopic plants, such as fungi and bacteria, one feeds on the other or one poisons the other. Or, differently expressed, there are antagonisms between different microbes just as there are, among different mammals, an antagonism between cats and mice, between owls and mice, or, among insects, between some wasps and their prey. When a spider spans her net out to catch insects, she also keeps the population of insects down. If all spiders were, through a sudden though unlikely catastrophe, killed off we should be overrun with insects. This not infrequently happens in other fields of natural interrelations. A couple of years ago I noticed in Texas an epidemic among toads and frogs, and one could immediately see how the sow or pill bugs increased everywhere, because their major natural enemies were decimated. The increase in rodents, both rats and mice, is to some extent due to man's silly fear of snakes. If we allowed those graceful and rarely dangerous helpers to live they would help us control other pests.

Wherever man has entered the field with strong measures, such as spray chemicals and dusts, a natural balance was upset, since some enemies of pests were killed off too. It was, for example, found that DDT sprays killed off certain insects which were harmless to man and his crops and that as a result the scale insects, on which these harmless predators fed, increased rapidly; for these scales were not affected by DDT spraying. Just assume that we keep on with chemicals for a generation or so longer. There will be numerous species of insects which will be destroyed as completely as the carrier pigeon was destroyed through man's interference or as the buffalo was destroyed in the wild. The insects which were formerly kept in check by antagonistic ones may, however, escape the chemist's one-sided attack and then increase beyond control. That something of this sort has been going on can well be assumed, for today the spraying orchardists are forced to use many more sprays than they used a decade or a generation ago. Thus, it does not seem as though our chemists had discovered a substitute for natural antagonisms between insects which eat each other up.

The same is true in the relationship of animals and plants. There has been

great clamoring about the poor seed yields of certain clovers. In the old days, there were enough wild bees, especially bumble bees, with long enough probosces to reach down into the long flower funnels from which they siphon the nectar. They produced, incidentally, but surely, pollination and therefore seeds. Modern methods of cultivation, modern chemical measures, and other factors unknown have decreased the number of wild bees, while the acreage planted to legumes was ever more increased. The results are poor seed setting and therefore high seed prices. A similar example is the attack on honey bees which is carried on by the spray-gunners. They are not after the bees, but after other insects which attack our fruit trees. Well, the bees too are insects and succumb to the poison residues that are left on the trees and especially on their flowers. As a result, pollination has been found to decline here and there. Give the spray-gunners a few more years of chemical warfare and the bees will not be able to live in those DDT areas. Then fruit, for the sake of which all this spraying and dusting is done, will no longer set, because not enough flowers will be pollinated.

Wherever man appears and impresses his will on nature by his crop production methods, some disturbances are bound to take place. Some became nationally known and feared, though they affected nothing more than a disturbance among plants. When man plowed up the prairies and sowed corn and grains year after year, he substituted a temporary crop for the permanent sod cover that had previously existed. This led to soil destruction on an enormous scale, to floods, and to dust storms. I remember reading a privately printed book of memoirs by an old Texan, Mr. Krueger, whose sons later became known as machine builders and merchants. The old man describes the rippling brooks, seamed with lush vegetation; water, fresh clean water everywhere. After the pioneers had come into the territory they cleaned out the trees along the river and made sewage canals and other seemingly necessary things that civilised people consider important. The river beds became flat, the water lost its freshness, and, shortly after, the clear streams and rivers became filled up and useless. The water was no longer drinkable and, of course, the water-table generally sank. Rivers which formerly were navigable miles inland had become silted and useless. But let a torrent come! Any good old rain which formerly was soaked up by the vegetation that covered the land was now hitting hard ground. It sought its lowest level and rushed toward the river beds, carrying with it sand and silt, ruining the rivers and —what must not be overlooked—depleting the land of water much needed.

Man does his utmost to assist in this silly process by building more and more dams and canals and causing the water which should soak into the ground to be carried toward rivers and out into the sea. In some areas close to the ocean, the soil has become so depleted of ground water that the sea water seeps in and destroys vegetation. Much of this has become generally understood through the work of the Soil Conservation Service, but much is still being bungled because dams are usually more popular and canals bring good cash to the group who builds them than sound saving practices by proper control of the soils.

These are just a few general thoughts on antagonisms. Man plays his part as a destroying agent just as much as do microbes or insects or predatory animals. But I should not like to close on a negative note.

It has often been observed that insect pests and plant diseases were diminished or even abolished when organics were put back into the soil. As we have said before, compost is an excellent food for bacteria and fungi. Where compost is added, there develops a balance of all sorts of small organisms which feed or feast on one another, and a harmonious balance re-

sults. This is the way nature wants it. This is the way nature had it before man started tinkering with it and destroying its harmony. For if there had not been a general balance through the millions of years of past history, we should not have arrived at our present status. True, some species have succumbed in the past, whole races of men, whole families of animals, but usually some others were able to fill the gap and to eke out an existence by keeping their enemies in check.

We know what compost can accomplish, we know what organic matter does to growing plants to which it makes minerals available that are there in the soil, but are not useable unless organic matter is also present; but we should also keep in mind what compost does indirectly by fostering a natural balance in the soil. We mentioned recently how the dangerous nematodes could be brought under control by supplying organic matter to the soil and setting up conditions which were favorable to the enemies of nematodes. But we can go many steps, many miles, further yet. Look at the landscape as man has made it, consider that problem of stripped lands and poor water retention. We have made quite a few observations around here which showed conclusively that land which became enriched with organic matter absorbed rains and snow fall and lost those little ponds which it had before. If compost were used all over the country, the water from above would not run off, but stay right there where it is needed, to grow better and healthier plants, to dissolve natural soil minerals, and to protect the soil from blowing. We should not drain the needed water out into the oceans where no water is wanted, we should not have the ocean gradually intrude into the shore lands, but we should have a reserve which would make droughts much less serious.

By using up the organic matter in the soil, man has upset many natural balances. By putting back organics and by using sound methods of enriching the soil rather than the chemical companies he can restore many of those balances, whether it be setting up natural antagonisms among microbes, insects, birds, mammals or whether it be in man's own immediate domain of conserving soil fertility and the needed water supply.

Strawberries And Vitamins

GEORGE L. SLATE and W. B. ROBINSON of the New York Experiment Station at Geneva made investigations of the ascorbic acid content of 308 different strawberry varieties and crosses. For strawberries have a higher ascorbic acid content than the other commonly grown temperate zone fruits. They found *Catskill* the highest and *Beacon* possibly a good variety for breeding for increased vitamin values. (Proceedings of the American Society for Horticultural Science, 47 (1946) 219 ff.)

Fruits of labor in Vermont

Good Gardening

By M. B. CUMMINGS

Vermont Agricultural Experiment Station, Burlington, Vt.

THE growing of a good home vegetable garden is always commendable. Farm families and city folks can get much satisfaction and contribute much to the general food supply. This seems necessary as long as the supply is limited and prices are high. We can mobilize for an abundance. We should.

Good Soil Comes First.

The first decision should be to make the garden effective. To do this one needs good soil, and this means the incorporation of much organic matter in the land. Avoid shade, tree roots, poor soil and new turf. Use manure, garden refuse, leaves and litter, straw or stalks after being composted. In fact all kinds of organic matter properly incorporated is a requisite for good gardening. This is good strategy.

Important Crops

Tomatoes, carrots, broccoli, cabbage, Swiss chard, and a few other sorts are economic, strategic and basic in food value. Greens of many kinds seem indispensable. Good spinach, lettuce, endive and asparagus; also beans of several kinds such as string, shell and pole; and arrange for their succession by successive plantings.

We cannot count on another good growing year. It may be very dry, or frosty, thus reducing production in several districts. Therefore it will be better to plan for an abundance. If we grow it, we may have it. A good rule,

therefore, is to grow well so that we may eat well, and be well. This is the goal.

Hardy Plants Early

Cabbage, beets, Swiss chard, radishes and turnips are hardy and should be planted early or as soon as the land is dry; beans, tomatoes, squash, melon are warm plants and should not be planted or set out till warm weather comes— or ten days after the cooler ones are planted.

Extra Early Vegetables

It is a pleasing experience to have extra early vegetables or transplants for the home supply. This is especially so if grown on one's own grounds or within one's own sheltered places. There is something exhilarating about one's own production that gives zest to life; it is a part of the joy of living. A few suggestions from others, coupled with a little home-made genius and originality will accomplish the desired result. A few hints will show how to proceed.

Early Rhubarb

New grown stalks of rhubarb from roots is an early luxury. It is easily done. New stalks of edible size can be had in early April if foresight is exercised and a little planning is done the fall before; or even in the warmer days of March when the roots can be dug and placed in warm quarters to grow. The buds for new stalks are already started and ready to grow upon the advent of a warm temperature.

Warm cellars or attics where there is light and heat will do. Sunlight is not needed, but better stalks will be secured if there is some sunshine. Pack the roots in good garden soil, using boxes or crates as containers. Keep the soil moist. If good sized clumps or roots are dug, better stalks and more of them will grow for extra early use. In three weeks or less, there will be new stalks to eat.

An outdoor location will do if a warm southern exposure is selected. The south side of a barn, shed or house where the wind does not strike but where the sun comes in warm, will give new rhubarb many days ahead of the usual garden supply. Williams Brothers, market gardeners of Westminster, Vt., who sell much in the Boston market, use the south side of the greenhouse and get liberal supplies in April. One may cover some clumps in the garden with boxes and manure and get early stalks from them.

Asparagus and top onions can be grown ahead of the usual time by somewhat similar methods, but a little more care is needed with them. A few hotbed frames set over the asparagus will start the growth ahead of normal time and give a pleasant surprise. There is zest in it. But there needs to be provision for protection when the weather relapses, and a few cool nights come as they generally do for a short duration.

Sweet Corn Ahead of Time

Good quality sweet corn is a joy any time but especially so when early and fresh from the garden, for then it is a delight. Extra early corn can be grown by starting some plants three or four weeks ahead of planting time. One way to get it,—is to grow a few dozen plants in clumps of turf under cover for a few weeks, then setting them out with the roots and soil undisturbed. This advances the crop about three weeks.

Proceed as follows: Select a few dozen clods of good turf of good garden soil equal to about one quart each in volume. Into each piece put two kernels, and put them in a warm place, where the seeds can germinate. A cool, dark cellar is not a good place. The seedlings may grow three weeks before setting out in the garden, at normal planting time.

Timely harvest is a major factor with all sweet corn. Speedy handling and immediate consumption to have it at its best is important. Sweet corn loses half of its sugar content in 24 hours after picking, if the temperature is over 80° F. It is best if eaten almost immediately.

Varieties to Grow

To carry out the plan with sweet corn one should select dwarf, short-season varieties or those not requiring more than 65 days to edible maturity, in contrast to the longer season of over 85 days. There are several short-season varieties from which selections may be made. "Pick-a-Ninny" is one of good quality, white when green, and dark blue when ripe; Golden Midget and the White Midget are of recent origin, the former probably preferred; and then there are others such as Whipple's Early Yellow and Golden Gem; also North Star and Seneca Dawn. The number of other good varieties of mid-season or later is almost legion and out of consideration here. Yellow varieties are probably richer in vitamins than those of other colors, but may not be any sweeter or richer in sugar content. White varieties are not rich in vitamins.

Succession Plantings

Succession cropping, as the name implies, means planting one short term crop after another so as to keep the land busy producing something and to avoid leaving open and useless rows or areas in the garden. It means doubling or tripling the produce per acre or per row without increasing the overhead expense. It means growing two or three crops in one row or in separate rows, planted in succession.

There are four general principles to be borne in mind in succession cropping. The first of these is that each crop should be able to mature in less time than the whole season. Second, the tillage demanded by the first crop in the series should be such as would leave the land in proper condition for the succeeding crop. Third, the crops should be so much unlike that they will not tend to exhaust the soil by demanding the same elements of plant food, and, what is equally important, will not carry diseases and insects from one crop to the other. Mildew on peas may reappear on the second crop when peas follow peas, and leaf spot on beans may reappear on the second crop. Fourth, succession crops need to be mostly of the cool season group, withstanding the cooler weather of Spring and Fall, even tolerating light frosts.

Crop in Succession

Succession cropping to be successful assumes some knowledge of the length of time that vegetables require to come to the edible stage or to full maturity. Some vegetables, like radishes and corn salad, will be large enough to eat in about four weeks from the time of planting; others, like corn, winter squash and potatoes would require the full growing season. String beans take from 40 to 60 days; bush beans, 46 to 60 days; Swiss chard, 35 to 40 days; corn salad, 40 to 50 days; cress or pepper grass, 20 to 25 days; forcing radishes, 20 to 30 days; winter radishes, 90 to 129 days; spinach, 40 to 60 days; early turnips, 60 to 70 days. And there are many more short term vegetables. Many of these can be produced in succession once or twice, or possibly three times, if good care is given the plants.

Some of the short-term crops may precede or follow some that are not three full-season ones but perhaps half season ones. For instance, early lettuce may be followed by snap beans, or some of the land may be planted to root crops such as beets, carrots or turnips, for Winter storage. In many places, a succession to beans may be spinach. Radishes or lettuce may be followed by early cabbage; early potatoes may be followed by beets or late cabbage, and early carrots may be followed by beans, late cabbage, or celery. Early lettuce may be followed by late cabbage. Many similar succession seedings can be made. Any resourceful gardener can make additions to the list.

Succession cropping which is the replacement of an early crop by one planted after the first one is removed is, of course, somewhat different from intercropping, partnership cropping, or companion cropping. Briefly, intercropping means interplanting or transplanting of two or more crops on a

specific area, one between and alternating with the other. Partnership cropping is the growing simultaneously of two crops of about the same season of growth but of different stature, habits and requirements. Companion cropping is the sowing or planting together of two or more crops that require different lengths of time to mature; for instance, cabbage might alternate in the row with lettuce. Lettuce, radishes, spinach or endive may be planted between the hills of cucumber, squash or melons. All of these methods are of real value in intensive gardening.

Getting Transplants

Beginners or even sophomores in gardening will do well to purchase their transplants of tomatoes, cabbage, cauliflower, etc. Place the order early with the local greenhouse man; or scan the garden magazines and farm papers for advertisements. Good plants can be sent by parcel post, and at small cost. Florists often grow transplants by the thousand and at small cost. Buy good plants rather than raise poor ones.

In order to carry out this plan, where transplants are used, one should arrange ahead of time for the late setting of winter cabbage, celery, turnips and similar plants. Many of these, as is well known, are usually planted early, but they can be planted late in the free areas or even planted in seed beds and transplanted to the row at such times as they are wanted, provided the "time-table" is worked out in advance. Generally it is not as easy to get late transplants as early ones, so one might grow his late ones to be sure of a supply. Plant the seeds in June or July.

Now Back to Soil

I began this article with a statement about soil; and now I want to conclude it with more about soil. In practical food production, an adequate content of organic matter is of prime importance. All vegetable plants need much humus as a soil medium and content. Organic matter serves several purposes. First of all, it supports micro-organisms which make available to plants the otherwise unavailable materials. In the second place, it improves the texture of the soil, making it more friable. Then, too, it increases the retention of moisture and nutrients so much needed by plants. Organic matter favors aeration through the soil, which is helpful, allowing oxygen to penetrate; and finally, it hastens decomposition, forming carbon dioxide, a mild acid which is important as a solvent, making minerals more readily available to plant roots. So it appears that organic matter in the soil is a fundamental requirement. It is well to maintain it.

Amidst Kale plants in Vermont

A Third and Unique Method of Milling Whole Wheat Flour

In the April number of the Organic Gardening Magazine (page 40) we stated that whole wheat flour is made (1) on a large scale by ordinary roller milling processes, and (2) by stone mills. And now we find there is a third and what appears to be an even better method of making whole wheat flour in which not a single part of the kernel is removed thus producing a flour which contains all the bran, embryo, wheat germ, wheat germ oil, vitamins, and minerals that are contained in the wheat kernel. This HI-VITA 100% COMPLETE WHEAT FLOUR is milled by the HI-VITA MILLING CO., Milwaukee, Wisconsin who use an exclusively patented process. By this process the wheat kernel is not broken, crushed, or torn between the opposing surfaces of two stones but is blown by a current of air against the surface of a single stone moving at a high velocity.

On The Organic Front

Mr. J. I. Rodale, Editor of Organic Gardening Magazine has recently returned from an extensive trip to the Pacific coast where he conferred with farmers and gardeners, and particularly orchardists, who are using the organic method exclusively and with such results that the growers are highly enthusiastic organiculturists.

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Mr. E. Stuart Hubbard, Manchester Road farmer and fruit grower, according to the Poughkeepsie Sunday New Yorker, maintains that organic farming not only replenishes the soil but also pays dividends in dollars and cents through heavier yields and better quality and crop plants. By following the organic method Mr. Hubbard produced 15,000 ears of sweet corn to the acre last year and has just harvested a wheat crop that averaged 40 bushels per acre when the statewide average for wheat is 18 bushels per acre. A field planted with Cornell 11 field corn is expected to yield at least 100 bushels per acre. Mr. Hubbard uses a modification of Faulkner's method in that he plows, disks, but with all he is sure to incorporate a liberal amount of compost in the surface layer of the soil. By careful preparation of the soil, Mr. Hubbard finds frequent cultivation not necessary. The weed seeds are killed in the compost heap instead of being returned to the fields in raw manure to grow there and make necessary frequent and expensive cultivations.

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Novelist James Street, author of "The Gauntlet" and other best sellers has accepted the organic method of farming and boasts the only 100 per cent organic farm in the vicinity of Durham, North Carolina. Mr. Street believes that there is no such thing as poor land—only poor farmers. By demonstrating to the Southern farmer how worn-out land can be reclaimed and restored to a state of high fertility, Mr. Street will be doing something much more fundamental than writing a best seller.

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SATISFACTION GUARANTEED

Edward H. Faulkner, A SECOND LOOK (Norman: University of Oklahoma Press. 1947).

Faulkner's *Second Look* is a discussion of the reactions which he received from the readers of his *Plowman's Folly* published years ago. Plowman's Folly was not so much an indictment against the plow as it was a condemnation of the bad farming practises that have already converted many millions of acres of highly productive farm lands into substandard farm lands and unproductive wastelands. Fertile soil is living, and its biological activity can be maintained only by giving to it the organic matter upon which it lives. Soil is as dependent upon food as is any living organism. By proper feeding, any arable but substandard soil can be restored to a high state of fertility but in this restoration the *time factor* is important. The principal thesis of *Plowman's Folly* is that organic matter must be kept in the surface layers of the soil by methods which necessarily vary according to local conditions. All soils contain the chemical elements which are essential to the growth and reproduction of plants but as a rule they are present in some insoluble form. The organisms which feed on the organic matter in the soil and make the elements water-soluble so that plants can absorb them, live in the surface layers of the soil because they need atmospheric oxygen in order to live at all. From the atmosphere also the nitrogen fixing bacteria take large amounts of nitrogen and convert it into forms that can be used by crop plants. Burying the organic matter deep in the soil, whether by plow or other tool, must be regarded as a bad farming practice.

Chemical fertilizers added to worn-out or substandard soils stimulate plant growth in the same manner as do chemicals when added to plants growing in pure sand. In either case relatively few or no soil organisms are involved. What Mr. Faulkner is trying to make clear to his readers is that just as soon as sufficient organic material becomes available in the soil to support the soil organisms that are essential to soil fertility, *the use of chemical fertilizers must be discontinued.* The soil organisms which convert the organic matter into humus which will, in turn, provide the cement that combines the soil particles into soil crumbs and make available to the growing plants not only the major and minor elements but also the vitamins which render the plants free from diseases and insect pests. By working more and more organic materials into the soil, substandard

soils can be converted into *real soil* which is black, crumbly, loose enough to be springy when walked over, free from crusts under all circumstances, and may be worked almost at once after rains when once it has warmed up in spring. Those who claim that chemical fertilizers are necessary for the growing of crops profitably need only be referred to the fact that many peoples of other countries have kept their land in a high state of productiveness since the time of Moses because *they used organic fertilizers exclusively.* These peoples carefully and religiously convert all plant wastes into compost. Their methods of making and using compost are described in such books as FARMERS OF FORTY CENTURIES by F. H. King, ARTIFICIAL MANURES by A. B. Beaumont, and PAY DIRT by J. I. Rodale, while periodical information on methods of organic gardening and farming as carried out in different countries of the world is given in the ORGANIC GARDENING MAGAZINE.

It would be difficult to overstate the rewards that accompany the new method of farming proposed by Faulkner. Real soil is so porous and absorbent that it drinks in practically all waters that fall upon it so that there is practically no soil erosion, it makes the expensive plowing operation unnecessary, it greatly reduces the expense of controlling weeds, it makes unnecessary the costly chemical fertilizers as the elements necessary for vigorous growth are provided by the soil organisms which live at the expense of the organic matter in the soil, it renders the crop plants free from diseases and insect pests, it gives to the foods a rich flavor and health-promoting vitamins. The soil needs only Nature's method of cultivation and enrichment as illustrated in a virgin forest or prairie. Nature has her own soil makers and her own methods. They are ours to use.

The bad farming practise symbolized by the tractor, plow, and chemical fertilizers not only leads slowly but inevitably to substandard soils but gives us food plants which are deficient in quality, texture, flavor, and the trace elements and vitamins which are so essential to normal health. There seems to be a direct correlation between the increased use of chemical fertilizers, the increased acreage of substandard soils, and the increased occurrence of degenerative diseases. Studies in nutrition reveal the fact that although our children seem to get enough food to eat they have a hidden hunger which is not conducive to that healthy condition of the body which is expressed in such forms as robustness, buoyancy, and the feeling of the joy of living. There is need also to modify the methods used in the processing of many of our foods so that they are nutritious as well as wholesome and cheap enough for all. As we spend increased sums of money for teachers, buildings, and books, we need to give increased attention to the nu-

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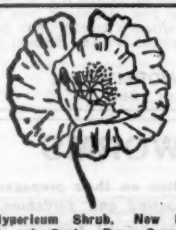

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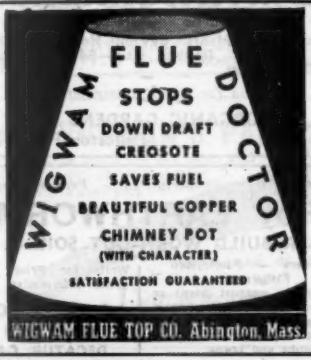

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trition and health of our boys and girls as well. The "key" to this more abundant life is a soil so rich in organic matter that it supports a rich population of soil organisms which alone can give to foods their health-promoting vitamins. Mr. Faulkner suggests that as substandard soils are reconverted into productive real soils rich in humus, the farmer of the future may well consider the converting of some of his cultivated acres into permanent pastures, orchards of fruits and nuts, and other farm operations requiring long-time planning which were profitable in virgin soils and will be profitable in real soils by proper farm practises.

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MELONS NEED COMPOST

Q. I raise melon and small fruit and berries. I am very much interested in improving the soil and growing a better product. I would like to find out why we used to raise melons to 150 pounds very common and now they seldom get over 50 or 60 pounds. They used to be ripe in July and now it takes until late August or September.

E. M. J., Fremont, Neb.

A. You have asked a very fundamental and a very basic question: Why was it possible to grow melons that weighed 150 pounds, but now the melons raised seldom weigh more than 50 or 60 pounds, and formerly they ripened in July while now the small ones do not ripen until August or September? The answer is quite simple, so simple indeed that most people overlook it.

Formerly the soil was rich in humus (decayed plant material) which served as food for billions of soil organisms as bacteria, fungi, earthworms, etc. Our farming practise fails to return to the soil what we take from it. More than 100 years ago a German scien-

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tist, Liebig made analyses of plants and all that he could find in them were calcium, nitrogen, phosphorus, and potash. He told the world that all that needs to be done in agriculture is to return these four elements to the soil. How wrong he was very few people even to this day realize. The fact of the matter is that healthy, disease-resistant, insect-resistant, health-promoting plants need most of the chemical elements that are known to science. Some elements are needed in larger amounts, others in exceedingly small amounts. The latter are often referred to as *trace elements*. But the trace elements are as essential to the plant and to human health as are the major elements, as nitrogen and calcium.

If you want to grow large melons that will ripen in July when they should ripen, stop using chemical fertilizers and make all the compost you possibly can. Convert all the plant materials, weeds, brush, farm and garden wastes, hay, straw, etc. into compost. If you do not know how to make compost send for "Compost—How to Make It," to our office.

—o—

PEA VINES FOR COMPOSTING

Q. Am writing for information concerning pea hay from a pea vinery. We have a vinery close by and I can get quite an amount of the pea vines (or hay) for hauling it away. This particular pile of hay is a year old and seems to be quite decomposed. The vines go through a heating process in the stack and steam for quite sometime. Could a person use this year old hay for mulching and in place of manure without harmful effects? Or would it have to be composted even

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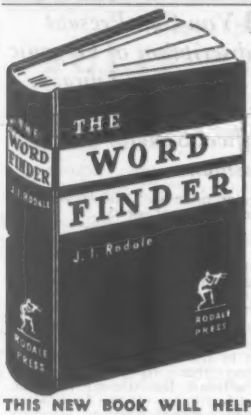

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if it is that old. I think due to the natural heating process it goes through that all weed seeds are destroyed if there should be any as I never see any weeds growing on the stack. Please send me what information you can in this matter, as to using for flowers, garden and greenhouse as a mulch or soil conditioner.

W. A. S., Sun Prairie, Wis.

A. The pea compost can be used quite safely in place of manure. It is quite rich in nitrogen, phosphorus, and potash. I suggest that you take advantage of this source of organic fertilizer. In all probability, the weed seeds were killed by the heat of fermentation in the stack.

The pea compost should be excellent for flower garden, vegetable garden, and greenhouse.

If and when green pea vines become available, I suggest that you get enough to make at least one good sized compost heap made in the regular way. This should give you an organic fertilizer of the very highest type.

—o—

EARTHWORMS CAN'T EAT CHEMICAL FERTILIZERS

Q. No doubt you have read the article in Science magazine by Henry Hopp and Paul J. Linder. I have not seen it but have just read a report of it in Time, July 14, p. 59.

Time's report cites several causes for diminishing earthworm population but makes no mention of the use of artificial fertilizers.

I should be interested in your comment on this; also on the methods proposed to protect earthworms from freezing. I had supposed they could

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take care of themselves in this respect.

I shall look for some advice on this subject in a forthcoming issue of Organic Gardening.

P. H. B., Manchester, N. H.

A. I have read the article by Hopp and Linder in Science and the review in the July 14th issue of Time. There can be no doubt that the fate of the earthworm in our cultivated acres is tied up with chemical fertilizers. Earthworms can live in soil that contains humus, because humus is the earthworms' food. To the extent that chemical fertilizers replace organic fertilizers the soil contains less humus and accordingly fewer earthworms. Then too soils that receive chemical fertilizers soon form a hardpan beneath the surface and this prevents the earthworm from easily burrowing into the soil. Earthworms are not winter-killed in soils that are rich in humus and have a good cover of vegetation which tends to prevent winter freezing and thawing. It is not the cold so much as the alternate freezing and thawing that kills soil organisms and plants in the soil. Earthworms can take care of themselves in soil having a normal amount of humus and a good plant cover.

—o—

THE BUG

Q. A neighbor who usually grows his own vegetables and has considerable flowers and shrubs said he did not believe in compost heaps because a certain bug gets into the compost and when it is applied to the plants, the bug will destroy them. Is this true?

C. S. Z., Long Island, N. Y.

A. The certain bug is a myth. When compost is made properly, it will heat to at least 150 degrees (F.) and no bug will grow rapidly at that temperature. Most of them will be destroyed Those which can escape will emigrate. Of course, if compost is left sitting for years it will be invaded by all kinds of bugs. That's why it is best to incorporate it when it's finished.

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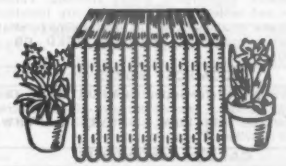

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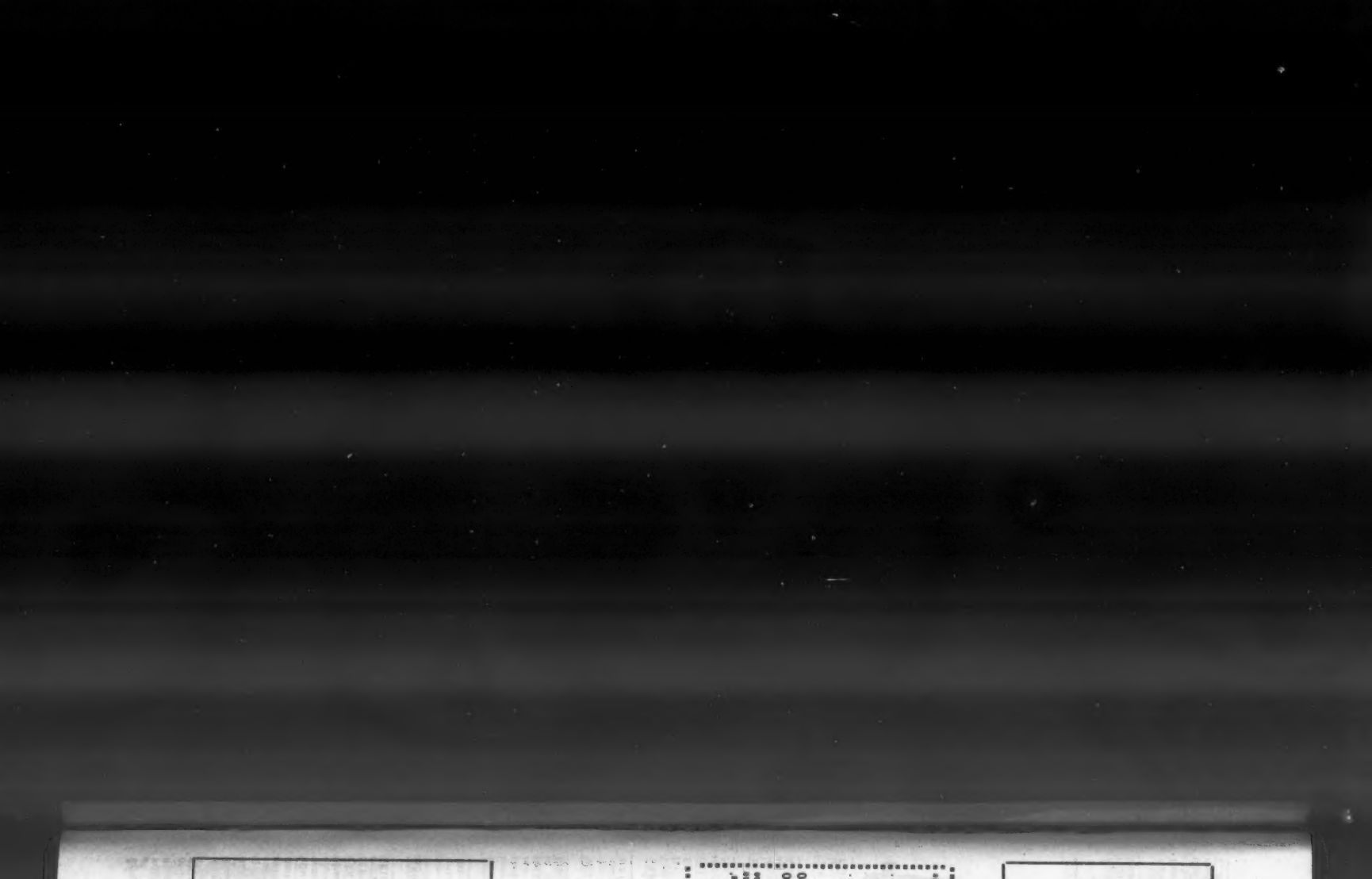

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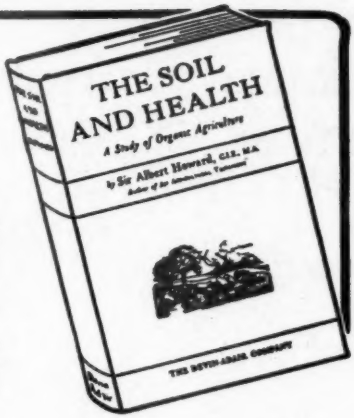

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